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RECONNAISSANCE REPORT ON SAN PEDRO PORTS CALIFORNIA(U)
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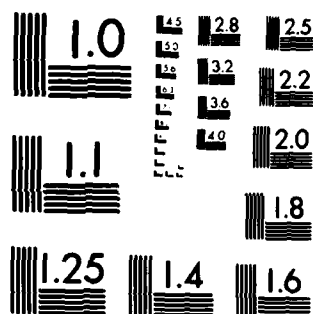
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RECONNAISSANCE REPORT

on

**SAN PEDRO PORTS
CALIFORNIA**

January, 1979

Prepared by:

VTN Consolidated, inc.
Irvine, California

Prepared for:

U.S. Army Corps of Engineers
Los Angeles District
Los Angeles, California

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* Contained in separate volume.

* * * * *

SAN PEDRO PORTS TRANSPORTATION PLAN

FOREWORD BY VTN CONSOLIDATED, INC.

Although many separate plans involving transportation in the San Pedro ports area have previously been made, this is believed to be the first occasion on which a composite approach on an integrated systems basis has been undertaken. Such coverage is fully appropriate, since transportation systems cannot be fragmented for individual users.

The projected increase in cargo anticipated through the Ports of Los Angeles and Long Beach to the year 2000, and the significantly increasing importance of the Pacific Basin in international trade, requires that future transportation systems are fully responsive to overall needs. To become completely effective and efficient, commonality in these systems is essential to make the optimum use of facilities and technology. The combined transportation plan here presented is the vehicle by which this can and must be achieved. VTN recommends that the plan is vigorously expedited to be fully compatible with the needs of the ports' increasing activity.

The details which evolve in this report are but a beginning of a far reaching and comprehensive undertaking; they consist of a complete rationalization and modernization of existing systems. They are, however, sufficiently flexible to accommodate changes in priorities and physical needs. Some innovative methods are proposed which, although possibly unusual at the present time, are anticipated will be commonplace in the year 2000, which the transportation plan addresses. Indeed, other new technologies, which are presently unknown, may also be introduced during the intervening period of implementation should they enhance the present proposals.

It has been a special privilege as well as a high responsibility for VTN Consolidated, Inc., to participate with the Corps of Engineers in the initial effort known as the "reconnaissance report." This has included both the transportation engineering and the supplementary measures, namely the environmental impacts of the plan and the public involvement program, respectively. VTN is conscious of the fact that it is only by developing the two latter features at the very beginning of plan formulation that the transportation plan can be fully effective and achieve reality.

During the initial effort, discussions have been held between the VTN project staff and a large number of organizations and individuals in the public and private sectors. Without exception, there has been unanimous and enthusiastic response and support. Indeed, most have signified their continuing interest, and have pledged their cooperation. VTN is sincerely indebted to all who have taken time

and trouble to discuss their concerns and problems, and to make constructive suggestions for transportation improvement in the San Pedro ports' area.

VTN is unable to take responsibility for Chapter V, Economics, as it was prepared by others.

During the period of this assignment, VTN has worked closely with the staff of the Corps of Engineers. VTN particularly desires to record its appreciation of the guidance, assistance and support of Mr. Daniel Muslin, the Corps' Project Manager, and his colleagues.

VTN Consolidated, Inc. takes the opportunity of thanking the Corps of Engineers for selecting this company for this important work and pledges to be available to assist the Corps in its ongoing efforts.

J. Peter Cunliffe

J. Peter Cunliffe, P.E.
Director of Transportation
Irvine, California.
December, 1978.



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CHAPTER I

INTRODUCTION

The San Pedro ports transportation plan was authorized by Section 163 of the Water Resources Act of 1976 (Public Law 94-587). The purpose of this initial effort is to produce the preliminary analysis, termed the reconnaissance report.

San Pedro Bay in California embraces three dynamic port areas; these include the Port of Los Angeles, the Port of Long Beach, and the Long Beach Naval Facilities. Although these three authorities are autonomous in their operations, many of their efforts and requirements must be united in order to obtain efficiency, economy, and environmental acceptance. One vital area in which a combined systems approach is required is transportation.

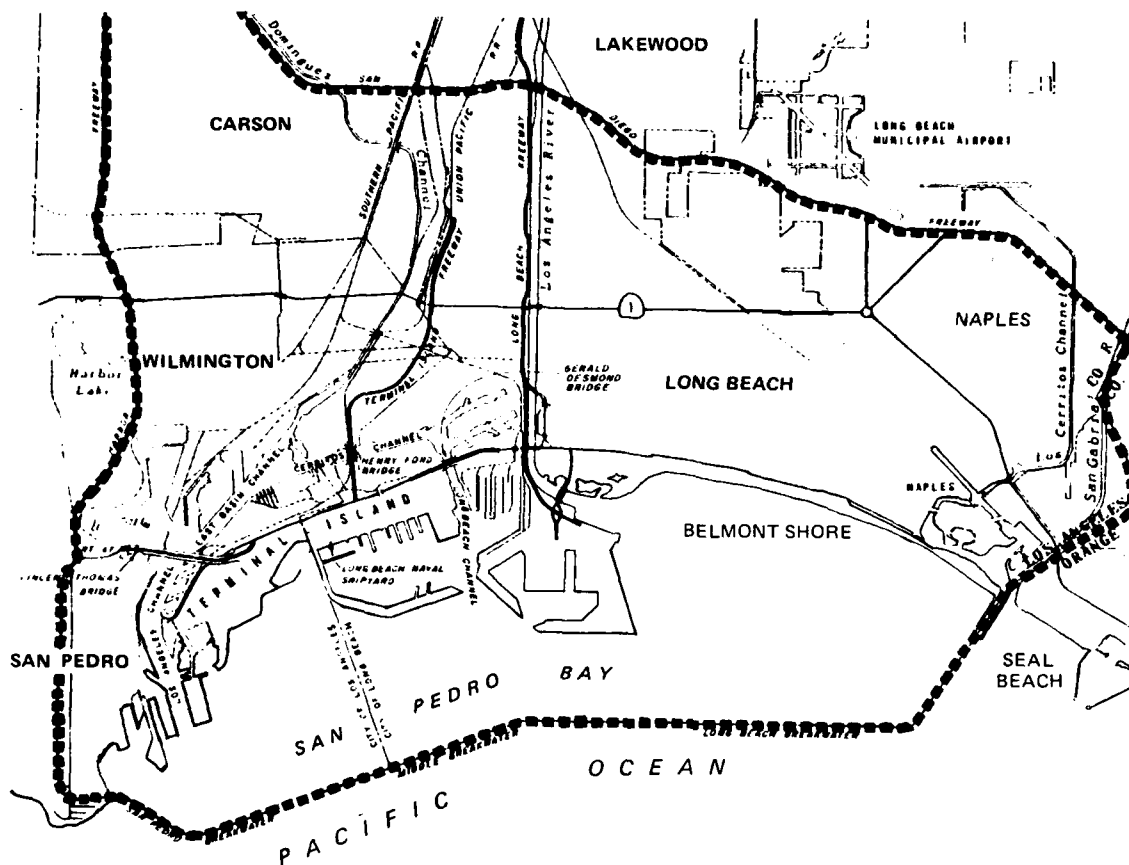
The magnitude and complexity of the overall transportation problem can be appreciated from the following brief synopsis of the commercial ports and naval facility in the San Pedro Bay. The area is illustrated in Figure 1.

The Port of Los Angeles is a \$560-million facility encompassing 7,000 acres of land, comprising sheltered harbor waters and 28 miles of waterfront. At the hub of a population market of 12 million, the port's imports and exports in 1977 were valued at \$11.3 billion by the U.S. Department of Commerce. Total cargo handled reached a record 35 million tons and was carried in over 3,000 vessels from 50 nations around the world.

Los Angeles Harbor is located 25 freeway miles south of Los Angeles civic and financial centers. Three major railroads and hundreds of trucking firms serve the port's 35 modern shipping terminals and extend the port's market area throughout the Southwest and across the nation.

The Port offers international shippers a wide variety of cargo-handling facilities and equipment. In addition to break-bulk, dry and liquid bulk facilities, LASH and Ro-Ro terminals, there are six large container terminals, two of which will become part of a massive 135-acre container complex now taking form along the main channel.

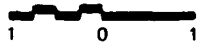
The Port of Long Beach, is a \$260 million facility situated adjacent to, and east of the Port of Los Angeles. It serves the Los Angeles/Long Beach metropolitan area with modern harbor facilities, representing an investment of well over \$260 million. During 1977, the port handled a record high of 32.8 million tons of cargo, valued at \$8.4 billion, the result of approximately 3000 ships' calls.



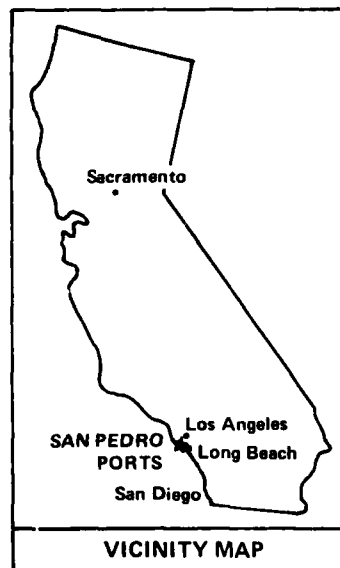
■■■■ STUDY AREA



SCALE IN MILES



Source: Corps of Engineers
Los Angeles District
South Pacific Division



PRIMARY STUDY AREA

FIGURE 1

A \$60-million expansion of container facilities is currently being completed, giving Long Beach a 320-acre container complex, with 13 large berths served by 15 high-speed cranes, backed by spacious container rail and truck terminals and container freight stations.

The Port of Long Beach has a bulk loader and includes liquid bulk terminals with up to 60 feet of water dockside, capable of accommodating ships up to 150,000 deadweight tons. The four-mile-long main channel is 60 feet deep, the deepest dredged fairway of any U.S. port.

Three major transcontinental railroads serve the port. Also, major trucklines link Long Beach directly to the interstate freeway system.

The port administration claims that highly specialized equipment has reduced the average stay of ships in port to less than two days, with bulk ships requiring less than half that time at dock. Containerships are similarly sped on their way, often with an eight-hour turnaround.

The Long Beach Naval Facilities, centrally situated in the San Pedro Bay between the Ports of Los Angeles and Long Beach, is a vital element in the national defense organization, in the accommodation and serving of up to 30 naval vessels. The complex includes two main sections: first, a specialized industrial shipyard and, secondly, a naval support base, handling seagoing ships with the appropriate facilities and logistical support. The former involves daily movement of people and goods; the latter has spasmodic transportation peaks resulting from vessel arrival and departure. The support of some 8,000 naval personnel, 2,000 families, and other service-oriented functions is a continuous responsibility of the naval facilities; approximately 8,500 civilian people are employed in this complex.

The Naval Facilities have a master plan currently under review relevant to the role to be played by all military bases in California. Additionally, various changes in organization (separating that operation involving military security from open areas) have recently been made. Furthermore, the base is being geared to handle an additional workload resulting from the "homeporting" of ships diverted from the San Diego Naval Base. Current activities and future operations require revised and additional transportation requirements.

Relevant Plans

Various plans have been produced in recent years for the future requirements and development of the San Pedro Bay port-related facilities. The Port of Los Angeles produced a master plan in 1975, currently being updated. The latter addresses port requirements to the year 1985. The Port of Long Beach also produced a master plan; this was documented early in 1978 in draft form, and was approved in 1978 by the California Coastal Commission. It is a short-term plan which sets forth the requirements and action for the Port of Long Beach for the next five years.

Although the three entities are separate in operation and accountability, their juxtaposition in the San Pedro Bay compels consideration of certain aspects of their operations to be made jointly. Transportation is one such element; it must be considered on a systems basis, because major local and national transportation facilities cannot be fragmented to serve individual locations or requirements. The same rail systems, highway arterials, water traffic and other transportation modes serve all three locations equally; their capabilities must be rationalized in terms of economy, efficiency, environmental impact, and convenience of commerce using and serving the Ports. This is the compelling reason that a combined transportation plan for the San Pedro Ports must be compiled.

The Ports of Los Angeles and Long Beach form the second largest center of maritime commerce in the nation; together these ports handled nearly 60 million tons of cargo during fiscal 1976-77. Both ports have made significant gains in total tonnage during the past several years which, in turn, means more maritime-related jobs to the benefit of all concerned in the local region. By the year 2000, which is the period addressed by the present plan, an increase of 350 percent in cargo is anticipated.

The Base Condition

Although the San Pedro ports provide access to local and regional markets through the various intermodal cargo transfer systems, the great majority of commerce is international in nature, involving three out of every four tons of cargo moved through the two ports. The 1976 population within the 60-mile radius of the San Pedro Bay was approximately 10 million, but the total market area extends both to the midwestern states as well as to the gulf and east coasts, the latter two by the so-called "mini-bridge" and "land-bridge" operations, over the rail networks.

In addition to the normal expectation of traffic increase through the San Pedro Bay, a new element has arisen in the year 1978, namely, the impact of the Panama Canal Treaties. Research has shown that a considerable rise in tonnage is expected to develop through the U.S. west coast ports generally, and through the San Pedro Ports in particular. The need to adequately accommodate this additional tonnage is an important element in the future transportation requirements of the port complex. It applies principally to additional cargo handling and storage areas, greater movement of cargo through the ports' additional berths, deeper draft vessels in the world's fleet, and more naval shipping. In consequence, improvement of capabilities, by rail and highway, as well as other means and modes must be developed to include people and goods throughout the whole of the San Pedro area and beyond, not least of which is the rail transport to the east.

Both Los Angeles and Long Beach ports have stressed, in their master plans, a lack of availability of undeveloped land. Space therefore, is

at a premium, and any plan which is to assist ports' development as a whole must inevitably review what can be done to increase the land availability for new facilities either by adapting existing land mass or by creating new. Transportation is vitally involved in these two features, and its improvement can contribute significantly to their development and operational use.

As the population has become more environmentally aware and ecologically sensitive to coastal development, governmental regulation has insisted that special environmental mitigation effects must be achieved in the development of new capital equipment and facilities. Special attention therefore must insure that environmental impacts and the ecosystems thus produced or affected are acceptable both to the regulatory agencies and to the public. Although recent technology makes port operation more capital intensive than heretofore, environmental impact requirements have made it more difficult and expensive to modernize. The economical viability of any plans, including transportation, has to be both sensitive to these factors and contributive to better conditions.

The basic function of any port is a gateway--an interface between sea and land transportation. It is, in fact, a specialized transportation and transfer facility of a highly complex nature. But however efficient and effective the port may be, the transportation elements play a major role in dealing with this interface. Each mode in itself primarily handles specific types of cargo, both import and export, but all must be treated on a coordinated basis to insure compatibility between the various modes as well as economy in the overall movement of goods. Furthermore, the efficient movement of people and goods affects the quality of life, the functioning of trade, the national economy, and numerous essential services. Transportation systems must be designed to suit the cargo to be handled, although there should be some flexibility between the various modes, including modal interchange.

Rail facilities in the San Pedro area were built in the early 20th century, during the great railroad building era in the United States. Since the end of World War II there has been very little railroad construction or upgrading of trackage; this particularly applies to the rail system serving the San Pedro ports, with the consequence that rail transportation is not keeping pace with port development and throughput. Port clients and customers are tending to turn to truck haulage thereby throwing additional burdens on the highway system. As a result, the pavements have deteriorated and a number of bottleneck and congestion points have developed, causing difficulty in entering and exiting the port area.

Air, noise, vibration and pollution have been the inevitable result; and safety has become a matter of concern within the Port areas and beyond. The need for "scenic routes," recreational facilities, bike-ways, and other indirect transportation facilities, too, is often lost in the pressure to provide primary modal and intermodal systems.

The San Pedro ports are heavily oriented toward the handling of bulk energy supplies, especially crude oil and petroleum products. Pipelines for these liquid bulk commodities are invariably installed piecemeal, without a rational plan, on an as-required basis. An overall transportation plan should contribute to systemized pipeway and appropriate pipeline application.

In addition to these various considerations related to the movement of goods through the ports' areas, the question of a future energy shortage is ever present. Transportation systems are currently one of the largest users in the world of the finite fossil fuel resources; any transportation plan must, therefore, deal not only with maximum economy of oil-based fuels, but also with alternate sources of power. This is complicated by the requirements of the California Coastal Zone Management Plan, with the national and international economic pressures as well. Transportation planning and implementation must thus be fully conscious of the need to reduce, wherever possible, the adverse balance of payments resulting from oil imports; and, in this respect, port-related transportation has a considerable contribution to offer.

More important than considerations of the existing and future equipment, facilities and transportation modes within and external to the port area is the fact that the operations are conducted by people. People need transportation to their jobs and to the facilities which they control. Also, being a water-related area, the San Pedro Bay is attractive for recreational purposes. Transportation planning, therefore, cannot ignore the requirements of people and their movement for all purposes, while contributing to the freedom objective and possibilities previously discussed. There is, for example, a shortage of small-boat marinas; these areas, along with access to them and facilities for them, are part of a transportation plan which must mesh within the total systems approach.

The use of land and facilities is one of the basic environmental issues. Sound land use management is fundamental both to preserving stable ecosystems and to controlling environmental pollution. Economic and social/political fundamentals are essential to proper land use and are widely recognized as such. The planning and construction of new highways or their improvement, revision of rail systems, provision of mass transit facilities, and the arrangement of sewers and other infrastructural utilities can have a powerful effect on local land use. Therefore, proper land management systems should be developed to insure optimum utilization of existing port land. This conforms with Section 30708 of the Coastal Act of 1976, which states as policy:

"Give highest priority to the use of existing land space within harbors for port purposes, including, but not limited to, navigational facilities, shipping industries, and necessary support and access facilities."

The formulation of alternatives toward the provision of a transportation plan for the San Pedro ports for the year 2000 does not attempt to become a land use study. Nevertheless, the changes in the transportation pattern and the facilities they serve form a subject which should be seriously considered when dealing with land use in the harbor area. It is not intended, however, to discuss here the effects of additional people and the services they will require, but rather to consider some points where land use changes are likely to be made as a result of the transportation plan.

Appropriate land management is an integral element of any plan to upgrade movement of cargo and people. Improved transport systems require changes of existing land use towards better utilization. Rearrangement of land uses can also contribute to the effectiveness of the transportation system. It is important that these elements are borne in mind throughout the implementation process of the transportation plan. Property leases in strategic areas and other inappropriate actions which are not conducive to the end result of the plan should not be allowed to inhibit such development. Nevertheless, short-term leases can be continued with existing clients or offered to potential new clients if the individual parcels are not earmarked for construction for a considerable time. Revenues should and must be sought wherever possible in the land-scarce area of the ports while opportunity permits.

And, last but not least, is the overriding consideration of national defense. The Long Beach Naval Facilities are a defense establishment per se; also, any plan proposed, or any facility implemented, must contribute to the national defense and be immediately available to military movement in a national emergency.

The needs of clients and customers, and of the public living and working in the area, must all be amalgamated for transportation efficacy. Only by this means can it be assured that they will be fully in agreement with, and flexible within the requirements of the ports for the foreseeable future. Also, any transportation plan must be capable of being implemented from engineering, operational, environmental, and public acceptance points of view; to ignore these elements would be unwise, as well as instrumental in hampering or preventing expansion or development.

It is therefore appropriate that a Federally funded study by the Corps of Engineers to develop a coordinated plan for all transportation serving the San Pedro ports and the Naval Facilities, the implementation of which is absolutely vital both in the national interest as well as the individual authorities concerned. Opportunity now arises to consolidate these requirements, assess the impacts, obtain public participation, and seek out the best method of implementing them to the benefits of all concerned. The recommendations developed thus far, and set forth in this report, seek to do just that.

* * * * *

CHAPTER II

PROBLEM IDENTIFICATION

There is a number of existing problem areas in the complex transportation system that serves the San Pedro ports, all of which are well known to the port authorities and the users. These problems are typified by road traffic bottlenecks, safety hazards (including rail/highway conflicts), and the shortage of water-oriented land. Other problems include a deficiency of parking areas in certain places, poor circulation facilities, and difficult ingress/egress to various industrial facilities in respect to both people and cargo movement.

Notwithstanding several remedial measures now under construction, the plan for transportation in the whole San Pedro ports area must consider existing problems as well as those likely to arise in the future as a result of development and modernization of port facilities. Even so, the plans of others must be reviewed relevant to overall compatibility and integration.

Present and expected future problems are discussed below.

Traffic Problems

1. Badger Avenue (Henry Ford) Bridge

This is a drawbridge, carrying three lanes of highway traffic and a single railroad track across the Cerritos Channel, Los Angeles/Long Beach Harbor.

Progressively heavier vehicular loadings over its 50-year life coupled with the advanced age of the bridge components, have led to increasing maintenance problems and to a concern for the actual safety of the structure. See Figure 2.

Although other highways connect Terminal Island with the mainland, the rail track across Badger Avenue Bridge is the only rail connection serving the island. Thus, the link is a vital element in the railroad operations on Terminal Island. Future development on Terminal Island indicates the need for an uninterrupted 24-hour rail connection across the Cerritos Channel. The existing bridge does not have this capability. In view of the expected importance of the rail link relative to the proposed Terminal Island landfill, a permanent, long-term solution to this bottleneck is essential.

2. Naval Traffic

As a result of a recent reorganization of internal arrangements at the Long Beach Naval Facilities, and the increase in the number of naval

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2. Naval Traffic

As a result of a recent reorganization of internal arrangements at the Long Beach Naval Facilities, and the increase in the number of naval

vessels, together with the fact that many naval personnel bring families to live in the area, ingress/egress from Seaside Avenue/Ocean Boulevard to the shipyard has already reached volumes which are critical, especially in the area crossing the Gerald Desmond Bridge. An early solution to this problem of traffic congestion is sought.

3. Seaside Avenue/Ocean Boulevard

This arterial highway is heavily congested with automobile and truck traffic; of special concern to the truckers is the hazardous and delaying intersection immediately east of the toll plaza for the Vincent Thomas Bridge. There is a problem at the latter location because grade separation is difficult.

With future rail tracks anticipated to cross this highway, an untenable situation could develop from both capacity and safety standpoints.

4. Pier A Avenue and Windham Avenue Intersection (Long Beach)

This "T" junction is heavily used by both local circulating traffic as well as that relating to the adjacent access to the (Long Beach) freeway. The situation is worsened by a single rail track, providing the only access to the outer harbor of the Port of Long Beach, slicing across the center of the intersection. The Port of Long Beach is engaged on design work to rectify this problem.

5. Gaffey Street

The northern end of Gaffey Street in San Pedro presently receives all traffic exiting the southerly end of SR-11 (Harbor Freeway). Increase in capacity is urgently needed as well as improved diversion to local streets.

6. San Pedro

The street system of the San Pedro business district requires improvement to meet the planned highway circulation of the general plan of the Port of Los Angeles. In particular, the deficiencies are in regard to:

- general circulation, connections and adequate capacity
- port-related movements
- scenic, residential and business activity.

7. City of Long Beach

Contiguous with port-related traffic is a number of street developments in the City of Long Beach. Interface between port and city road systems may thus present a problem when detailed analysis is undertaken.

Railroad Problems

Most of the existing tracks within the zone of operation were installed at the turn of the century. The original form and configuration have changed little since then, and it is obvious that there is not only a large amount of spare capacity involving valuable land occupation but also a considerable amount of trackage which appears to be redundant. A problem here is how best to abolish redundant tracks and at the same time improve operations.

There are currently four major problem points within the port operating area:

1. There is reliance on the single connection from the junction of the Santa Fe and Southern Pacific Railroads to the north entrance to the Wilmington yard (in the vicinity of Avalon Blvd. grade crossing to Pier A yard), which is also the link to the West Basin Line, San Pedro yard, and the Port of Los Angeles bulk loader.

2. The single lead from the main rail network (particularly 8th Street yard) serving the outer harbor of the Port of Long Beach is heavily used, especially as it serves the bulk loader and grain terminal, handling both switching movements and unit trains. If unit train operations are to be increased, as is expected, the capacity of the existing single track, in addition to its present alinement, is believed to be inadequate and in need of improvement.

3. Splitting of unit trains serving the bulk loader and grain terminal in the Port of Long Beach is necessary due to the fact that the rail sidings at these two facilities are too short to accommodate maximum train lengths. This situation, along with other rail and highway configurations in the outer harbor area, amounts to a serious overall problem of movement and flexibility requiring an equitable solution.

4. Within the ports' area, there exist many hazardous situations caused by inadequately protected rail/highway crossings, dual use of streets (by rails in the pavement), service and other roads crisscrossing the tracks, and random use of the area by both highway and rail movement. A safety risk adds to the need to solve many of these individual problems.

Similar problems of grade crossings exist beyond the primary area of the San Pedro Ports.

Flood-Control Channels

Two major flood-control channels, the Dominguez Channel and the Los Angeles River, empty into the San Pedro Bay. Being underused rights of

way, the potential for their use as transportation facilities is to be investigated. Some problems in doing this will be related to the types of transportation for which the channels could be suitably used and a determination of what, if any, engineering changes or modifications will be needed. A further question to be addressed here is what, if any, restrictions would have to be imposed in the light of their dual or multiple use due to proximity to residences.

Combined Container Distribution Center

In order to avoid the need to haul containers from the ports' area by road to rail facilities in the vicinity of Los Angeles, a distance of some 25 miles, a requirement exists to build a combined container distribution center specially to serve, and in proximity to the Ports of Los Angeles and Long Beach. This center would include all necessary facilities for stuffing, assembling, loading, unloading, transfer, and turn-around of containers. It would consist of loading docks, ramps, full rail and road ingress and egress, together with a container storage yard. Facilities and trackage would be part of the complex to provide for unit train make-up for dispatch, and reassembly for port distribution, and able to handle container-on-flat-car (COFC) and trailer-on-flat-car (TOFC) formations.

The problem has been not only one of selecting a suitable site, but also a determination of how it can be linked with ocean-going shipping. Traffic (both rail and road) for long distance transportation within the United States as well as across the mini-bridge and land-bridge is an additional factor to be considered.

The center will require to be complimented by the most modern apparatus for trans-shipment, as well as to have good accessibility to trans-continental transport arteries.

Joint efforts have been pursued by Los Angeles and Long Beach harbor officials to find a mutually suitable location for a railhead near both ports and to convince the railroads to establish connections to such a point when determined. The situation is still unresolved and loss of tonnage through both ports is threatened.

Drayage Charges

In 1974 a situation of grave concern to the Ports of Los Angeles and Long Beach arose by the imposition of an inventory tax on containers by the Los Angeles County Tax Assessor, effective on March 1 each year. This creates an additional need for the construction of a railroad ramp and railhead in the immediate harbor area to avoid shippers diverting containerized cargo from Los Angeles and Long Beach Ports to railheads 25 miles distant to avoid delays in the ports area, or in some cases relocating their businesses.

Union Problems

The trades unions have several concerns which are essentially port problems; these are:

- Safety needs to be improved; proper transportation planning on a system basis, as well as consolidation of the modes, can effectively contribute to this achievement.
- Production needs to be increased to a 24-hour, 7-day-week operation. The transportation system is required to be compatible with this worthy intent if the port operators are able to accept it.
- There is a need for expeditious clearance of cargoes from the port facilities. Contributing to the restriction of cargo movement in the port area are various procedures (including mandatory customs clearance and paperwork) and congestion on the existing street system (problem points, inadequate arterials, and restricted freeway access).

Most of these concerns of the unions constitute problems to be addressed in designing the overall transportation plan.

Environmental Problems

The requirement to improve the environment of industrial areas such as San Pedro Ports needs no elaboration here. The problem to be addressed in formulating transportation alternatives is how adverse impacts on the environment can be mitigated or minimized and how the environment may be improved even though cargo is steadily increasing.

Area of Activity

All these problems relate to the so-called "primary area"; this consists of all port-related activities encompassed by the San Diego Freeway (I-405) on the north, the outer breakwaters on the south, the San Gabriel River on the east and Gaffey Street, San Pedro, on the west. Problems of systems external to this area will be limited to those requiring no more than the application of standard engineering and operating methodologies according to capacity requirements.

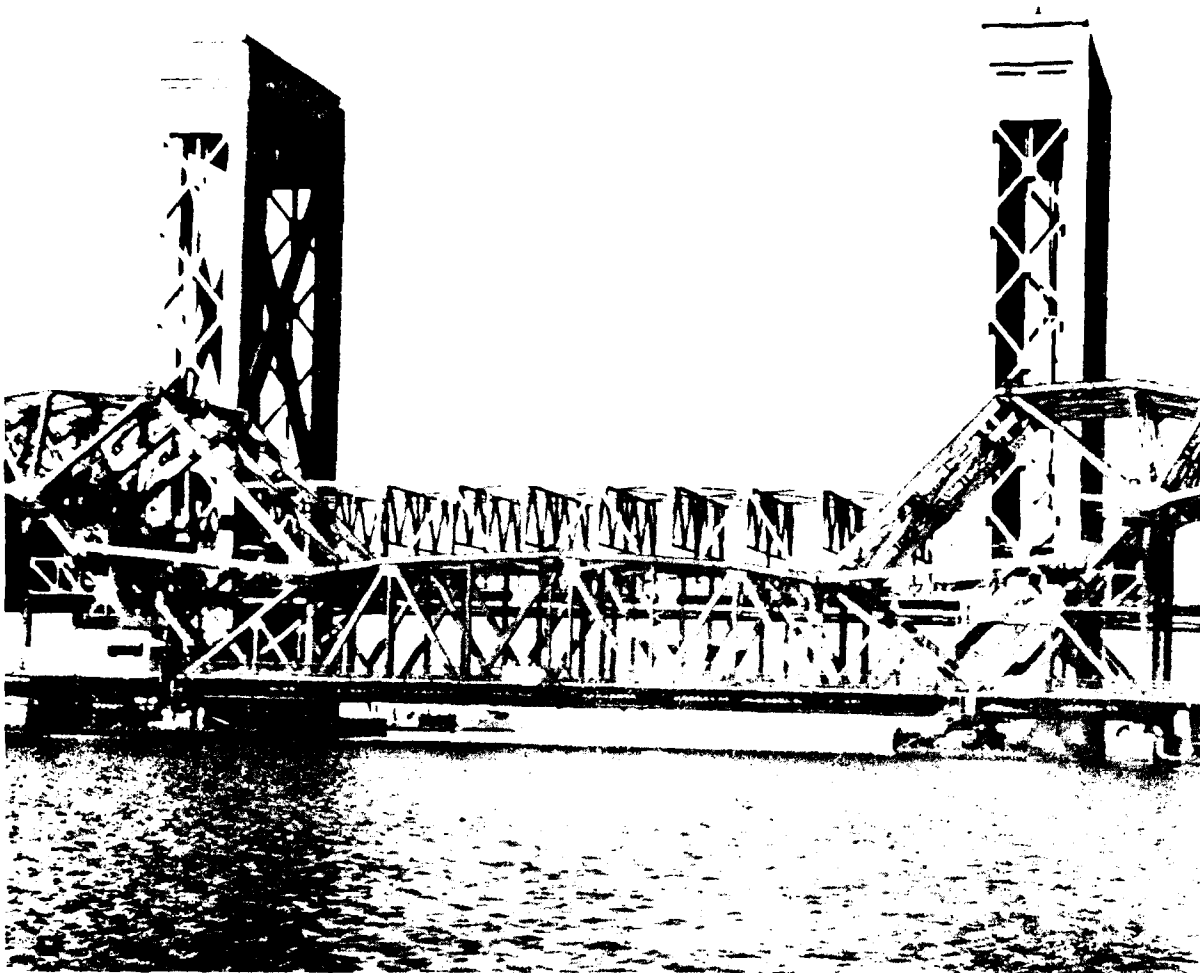
Operator Considerations

Rising operating costs, the availability of improved materials handling equipment and, most importantly, the long-range transportation plan, should tend to intensify land uses within the port area, leading to optimal use for all types of cargo terminals. In the context of "landlord ports", under which the Ports of Los Angeles and Long Beach

function, the position of the operators is worthy of consideration. In fact, before making an expensive investment in new equipment and storage facilities, a terminal operator will typically need to be assured, first, that he has a long-term lease on the property and, secondly, that he can count on adequate efficient, fast and serviceable transport facilities, such as the present planning seeks to provide. The terminal operator, furthermore, will look for a transportation system which will provide expeditious turnaround of ships and the effective scheduling of train and truck interfaces. He will attempt to avoid double handling of cargo in order to enhance profitability of his operations. To meet these and other needs, the proposed system for the year 2000 demands that a reorganization of land management objectives be accomplished within the ports areas to facilitate the expeditious passage of all cargo moving through the ports, as well as the efficient and satisfactory accommodation of the people who perform the operations.

Accordingly, there are problems in regard to revising the land use plan for the San Pedro ports area to reflect the new growth resulting from the long-range transportation planning and a plan for accomplishing its objectives. This effort should concentrate on the adjustment of land utilization to insure the most efficacious contribution and maximum intensity in respect to the reorientation of both previously occupied space and that which becomes available.

* * * * *



CERRITOS CHANNEL

- depth, 40 feet (MLLW)

BADGER AVENUE BASCULE BRIDGE
(foreground)

- vertical clearance (down), 37 feet

COMMODORE HEIM LIFTBRIDGE
(background)

- vertical clearance (up), 162 feet
vertical clearance (down), 37 feet

BADGER AVENUE & COMMODORE HEIM BRIDGES

FIGURE 2

CHAPTER III

FORMULATION OF ALTERNATIVES

The scenario for the formulation of alternatives is based on the mix of modes available to undertake various types of specific movement of people and freight in the year 2000. Each system contains options in development, as shown in the engineering alternatives analysis, presented in Figure 3. This analysis summarizes the baseline; lists the effects of no development (i.e. "without project"); presents the proposed improvements for each mode; and offers advantages/disadvantages of the recommended action. Each is discussed in detail in this chapter.

Descriptions of container movements now follow to facilitate the understanding of the relevant sections of this chapter:

Land-Bridge - an intermodal sea/land transport system under a single bill of lading and a joint through-service tariff using the U.S. transcontinental railway system connecting U.S. west and east or gulf coast ports for the movement of cargo between foreign ports of origin and destination.

Mini-Bridge - an intermodal sea/land transport system under a single bill of lading at a single rate under a joint through-service tariff, using the U.S. transcontinental railway system connecting U.S. west and east or gulf coast ports and railway terminals for the movement of cargo between foreign ports and railway terminals in U.S. port cities, via U.S. port cities on the opposite coast.

Micro-Bridge - an intermodal sea/land transport system under a single bill of lading at a single rate under a joint through-service tariff, using U.S. railroads connecting a seaport with an inland major metropolitan city. It differs from mini-bridge in that the cargo has its origin or destination at a rail terminal in an inland city as opposed to a rail terminal in a seaport city.

It is to be borne in mind that land-bridge and mini-bridge offer an alternative to the Panama Canal; they are savers of energy, particularly if unit trains can be arranged to the maximum extent; if they contribute to the improvement in air quality (especially in such areas as the San Pedro Ports); and if they are cost effective compared with other alternatives.

The U.S. Army uses containers provided by the several U.S. flag ocean carriers under contract with the Military Sealift Command for the bulk of its point-to-point overseas traffic and, in addition, has about 5,000 20-foot containers of its own. These containers have the prefix letters MILVAN, which distinguishes them from the earlier and smaller

CONEX container. These MILVANS were built to established international standards and they are completely interchangeable for handling and stowage in cellular containerships. The Armed Forces need to control their own equipment at all times, but they also need the speed and economy of both land-bridge and mini-bridge when projected movements combine both transcontinental and overseas shipping.

Unlike sealift requirements, which can only be accommodated with fixed numbers of conventional and cellular containership tonnage, the U.S. land bridge capability can be expanded overnight in both capacity and service network. It is probably the only major land bridge route in the world that can be relied upon at all times and under all conditions for whatever may be required of it. These requirements could range from total peace to total war.

However, the strength of these statements is valid only if terminal and transfer facilities are fully efficient as regards capacity and capability, a subject requiring full recognition in the transportation arrangements in the San Pedro Ports.

BASIS FOR ACTION

The formulation of alternative transport modes relative to the year 2000 for the San Pedro Bay commercial ports is based on the following reference material:

1. The Corps of Engineers Commodity Flow Study

This document provides a range of waterborne commerce projections for the combined Ports of Los Angeles and Long Beach (LA-LB). These projections were prepared by the Corps' Economics and Social Analysis Branch, South Pacific Division, and will be used by the Los Angeles District as basic data for evaluation in other study elements of the review report for Los Angeles and Long Beach Harbors, California.

The combined ports of LA-LB accommodate a wide array of cargo types, which require varied facilities for efficient operation, such as container cranes, grain silos, clear span transit sheds, deepwater petroleum terminals, and special facilities for handling bananas, citrus, salt, molasses, and automobiles.

The study considers a range of LA-LB waterborne tonnage projections for foreign imports, foreign exports, coastal receipts, and coastal shipments. Projections are disaggregated to 21 commodity groups and four methods of shipment categories for the target years 1980, 2000, and 2020. The four methods of shipment are container/ LASH, break bulk, dry bulk, and liquid bulk. All waterborne commodity groups are included except fresh fish and other marine products or sand, gravel, and crushed rock. Projections are in terms of short tons (2,000 lbs.) and they are not assigned monetary values. The table on the following page provides an overall summary picture, using middle (average) projection details.

LOS ANGELES-LONG BEACH
WATERBORNE COMMERCIAL PROJECTIONS

SUMMARY TABLE

Year	1973		1980	2000	
Type of Cargo	Short Tons	Short Tons	Avg Annual Growth %	Short Tons	Avg Annual Growth %
All (imports, exports, coastal)	50,436	97,020	9.8	181,301	4.9
All, less crude oil and LNG	30,955	39,510	3.5	93,706	4.2
Imports	21,537	21,381	-0.1	47,546	3.0
Exports	9,790	12,882	4.0	33,042	4.6
Coastal (Receipts)	11,210	55,061	25.5	93,822	8.2
Coastal (Shipments)	9,899	7,696	-0.4	6,891	-0.5

- Notes: 1. The tonnages and average annual growth percentages are given in the median range between high and low. Adjustments will be required as conditions warrant.
2. The average annual growth are calculated from the base year of 1973.

Currently there is hardly any commodity that at some time and place would not be loaded into a container; noncontainerizable commodities are now the exception. United States foreign trade containerized cargo has grown at an increasing rate since 1970. The containerized share of total general-liner cargo has also increased significantly.

Foreign container trade for the U.S. west coast has also shown dramatic growth. Several factors have been instrumental in the increase of container cargo movements. Some of these factors are:

- world-wide acceptance of containerization
- large increase in the number of containerships which are fast and fully automated
- improvements in port facilities and cargo-handling equipment
- containerization of commodities previously considered "uncontainerizable"
- introduction of additional markets (including movement concepts such as mini-bridge and land-bridge)
- emergence of container leasing, including the "lease here/drop there" program which offsets a carrier's reluctance to provide container service on routes with insufficient containerizable return cargo.

2. The Los Angeles Port Master Plan

The Los Angeles Port Master Plan is in draft form and under revision at the present time. The final plan will cover relatively specific internal and external access road and rail development which is expected to be required in the short-term (defined as five years). The long-term road and rail development plans will be conceptual in nature and will reflect other long-term concept development in the various port areas. Plans for external road and rail connections originating within the port will have to be consistent with the City of Los Angeles' general plan and its LCP for municipal areas lying within the Coastal Zone, and subject to the provisions of the California Coastal Act of 1976.

3. The Long Beach Port Master Plan

This plan is based on a 5-year anticipation and identifies certain transportation problems, including primary access via Ocean Boulevard-Seaside Avenue; secondary access by way of Henry Ford Avenue, Harbor Scenic Drive, and the Queens Way Bridge; and all three freeways serving the port operating at relatively high levels of service.

The Long Beach Port Master Plan recognizes that the north/south transportation corridor north of the port area will be very deficient in vehicular capacity in the future if the presently planned area-wide developments are not implemented, and if there is no significant change in today's mode of travel.

Besides the additional traffic that will be generated by the implementation of the Master Plan, it identifies a number of other planned projects in the vicinity of the port that will generate substantial traffic volumes on the study area street system. It also states that, over the long term, if the Long Beach Freeway is not widened and the Terminal Island Freeway not extended, the traffic demands on the entire street system in the eastern portion of the planning area could exceed available capacities by more than 100% at many locations.

The plan states that provision of transportation alternatives could reduce future traffic demand/capacity relationships. The possible mitigation measures are (1) encouragement of use of rail transportation for port-related construction and operational activities, and (2) provision of preferential and/or exclusive lanes for buses and other high-occupancy vehicles.

The Port of Long Beach is planning early implementation of some local transportation projects. For example, an increase in unit trains serving the bulk loader and grain terminal will necessitate an improvement in the rail-feeder trackage.

4. The Long Beach Naval Facilities

An overview of the present needs reveals the details of two main elements; the first is an industrial complex handling ship repair, and the second is a naval base supplying 25 to 30 ships, which involves 8,000 naval personnel and 2,000 families. The total number of civilian staff at any one time is between 7,500 and 8,000. Some of the naval personnel are housed within the complex in naval housing, but a large proportion of them are drawn from San Pedro and neighboring cities as far away as Compton, Carson, etc. Many of these people use Route I-47 to travel to and from work.

The naval base is concerned about the ingress and egress of the workers. The requirement is to alleviate the problems, not only by accommodating private automobiles, but by providing the necessary circulation and line haul by buses to and from adjacent cities. Parking is also a problem; most of the employees working at the base use private automobiles, with the consequence that parking inside and outside of the base is inadequate.

Supplies and equipment are mostly trucked into the naval base. This adds to the highway congestion and the problems of ingress and egress

causing considerable delay in overall operations. Very little freight traffic uses the rail facility.

A 50% increase in the population of the shipyard is anticipated by the year 1984. This in turn will necessitate increased supply and support facilities with a prorated increase in population to handle them. As a result, a much larger operation is anticipated in the complex and this will cause additional traffic problems to those mentioned above. Further transportation problems will be created by the forthcoming diversion of naval shipping from San Diego to Long Beach.

RAILROADS

The rail alternative is probably the most efficacious transport mode serving the San Pedro ports. It is energy efficient, most acceptable environmentally, minimally labor intensive, and most easily adaptable for the increased capacity requirements. As illustrated graphically in Figure 4, it will embrace the requirements of the changing situation discussed previously, and at the same time will produce a number of significant advantages generally to enhance the transportation functions of the entire the port area. Additionally, it will result in an improvement in rail operations, speed traffic handling (and thus revenue), contribute to energy saving, reduce air pollution, and provide more job opportunities at a higher level of sophistication.

The new rail plan is fully comprehensive, and it establishes a completely revised concept in port-related rail functions. (Piecemeal and isolated improvements are not recommended, since a systems approach is seen to be essential to avoid ineffective treatment.) The proposed system is based on a centralized railhead specifically to serve the San Pedro ports, connected to a revised configuration throughout the ports area designed for 21st century operation.

Salient features of the new system are:

- Establish a modern port-related railhead in the form of a new modern automated classification yard in the so-called classification yard area to be jointly owned, operated and used by the three main line railroads, the Port of Los Angeles, and the Port of Long Beach. The yard should contain:
 - arrival/departure roads
 - classification yard/hump (mechanized and automated)
 - bypass roads for unit trains
 - locomotive release and reversal facilities

The location of the yard and initial configuration details are shown in Figures 5 and 6.

- Divert all three main line roads directly into the north end of the yard, using present access lines as far as possible.
- Construct access tracks to all present harbor facilities from the south end of the proposed classification yard, and provide for connections to new facilities as required.
- Build a new (high-rise) control tower as part of the mechanized classification yard facilities. Provide offices in the control tower for the general manager of the (reorganized and extended) Harbor Belt Line or appropriate combined operating agency and staff, including the terminal superintendent and yardmasters, to exercise centralized supervision. Closed-circuit television, more extensive radio coverage, an improved internal telephone network, and other ancillary equipment will be necessary. Refer to the description on the following page as well as Figures 7a, b and c.
- Install full signaling on main line roads and a supervisory control system for all harbor rail operations complimentary to yard mechanization, and operated from the centralized interlocking system.
- Install a data collection and processing system for all trains and use the information for sorting and distribution.
- Incorporate into the control tower a communications center with access capabilities to all railroad stock computers as part of the new combined operations.
- Reorganize the responsibilities of the operating railroad and extend its area of operations. Increase the staff and facilities to take full responsibility for the inclusive control of all harbor-oriented rail facilities, including the new automated classification yard. Figure 8 is a suggested arrangement.
- Centralize management and staff facilities in the control tower building (including port representation).
- Serve the new control center/maintenance facility with highway-access car parks and a station on the (proposed) transit system.
- Possibly eliminate the Badger Avenue/Henry Ford Avenue drawbridge bottleneck across the Cerritos channel by constructing a new facility to carry rail track(s), highways, utilities, telecommunications cables, and pipelines required

SAN PEDRO PORTS
RAILROAD MODERNIZATION
THE PROPOSED CONTROL TOWER CONCEPT

The control tower will be a ten-story, high-rise, structural-steel-framed building with a precast concrete exterior. Included will be vertical transportation/circulation elements constructed on two sides of the elevated glass steel-clad control room, operations offices, communications/computer center, operating railroad offices, and ports/traffic staff offices. The control room, containing the signaling console and other operational equipment, will provide observation over the classification yard and beyond. First floor occupancies include lobby, reception, workshops, cafeteria, meeting room, boiler room, loading dock, and freight and passenger elevators.

The proposed two-acre site for the control tower is located north of the classification yard hump crest/grade separation at Sepulveda Boulevard. The site plan provides parking for over 110 passenger and service vehicles.

Floor/Site Areas Summary is as follows:

First Floor	Lobby, cafeteria, meeting rooms, building services	8,840 SF
Second Floor through 5th	Equipment, storage and spare space	4,800 SF
Sixth	Ports' traffic staff offices	3,200 SF
Seventh	Operating railroad offices	4,200 SF
Eighth	Communications center and computer room	4,200 SF
Ninth	Control room	4,200 SF
Tenth	Mechanical elevator and other equipment	<u>2,400 SF</u>
TOTAL		31,840 SF

The estimated cost of the fully equipped building, ready for occupancy, less off-site work, and without furnishings and equipment, is +\$2 million.

by developments on Terminal Island and the landfill. Several options are available, see below.

- Improve handling of containers and reduce their shipside storage by constructing a combined container transfer yard and ramp facility in an area adjacent to, and served directly from, the automated classification yard.
- Facilitate rail movement in main supply arteries and improve highway circulation by constructing grade separations of rail/highway crossings in critical places.
- Recover surplus yards and individual redundant trackage throughout the harbor area.

Within the configuration proposed for the new rail system, there are various alternatives to be considered, especially in respect to the detail of implementation.

The Cerritos Channel Crossing

A permanent, long-term solution to this problem bottleneck must be found; in fact, the crucial factor in the planning of the rail needs to serve Terminal Island landfill is the connection south of the new classification yard across the Cerritos Channel. At the present time, this is handled by means of the Badger Avenue (Henry Ford) drawbridge, the life of which is limited. In order to accommodate faster-running trains and to increase the capacity of this link, it is necessary to consider the options available for its alinement.

An examination of the site and an assessment of proposed land-use developments involves the consideration of five options, discussed below. In any consideration, it is important to stress that due to the high standards of service that must be provided by this rail link to the new port complex on Terminal Island, the line must be uninterrupted.

The primary use of the new connection bridge is to accommodate the rail track. It is, however, the intention that it will additionally be designed for highway use and will accommodate utilities, communications, and pipeways between Terminal Island and the mainland.

Option 1 - Bridge/On Grade

Bridge/on grade (Figure 9) is the chosen option and it has been developed in detail to check actual feasibility. It consists of a fixed-span (two-track availability) rail bridge over the Cerritos Channel, with approaches on embankments and structures, the detail of which will be according to design solutions.

The type of construction will be decided at the preliminary design stage; however, the best option appears to be to construct the new bridge adjacent to the existing drawbridge. The new bridge may be a single span or two spans with a central pier, the length of which will depend on the required width of the channel (which will be decided later).

Note that the consideration of utilizing the structure and foundations of the existing (Badger Avenue) drawbridge, abandoning the highway portion, and making allowance for two tracks is being considered as an interim solution by the Port of Los Angeles.

Following the movement from north to south, the rail line would take off from the present track north of Badger Avenue bridge, rise and traverse the new bridge, descend to grade in the (abolished) Brighton Beach yard area, and thence go to the Reeves Field area, grade separated from the (new) Seaside Avenue Freeway.

Investigation into shipping requirements revealed that a clearance from MHW to the underside of the structure should be 37 feet, to coincide with the lowered clearance height of 37 feet above MHW of the Commodore Heim Bridge.

This option is subject to formal approval of the U.S. Navy, Coast Guard, and other parties, and it could include a "knock-out" section for displacement in a catastrophic situation requiring free water passage.

Option 2 - Causeway

Taking off from the present alignment of the rail track southward, the track would cross Cerritos Channel by means of a fixed causeway. Thence, the line would turn in a southwesterly direction. To avoid conflict with highway traffic, the track south of the causeway would need to be grade separated in respect to New Dock Street and Seaside Avenue. Figure 10 refers.

This concept does not impact the additional property proposed to be acquired by the U.S. Navy south of Seaside Avenue. Service roads from the U.S. Navy and other facilities on the south side of Seaside Avenue are accommodated in the highway plan. Note that if the causeway were to be the chosen solution, it would impact Matson Terminal's long-range plans to expand from Berth 206 east to the Dow Chemical property and, therefore, would necessitate a tradeoff in land uses (i.e., causeway access vs. general cargo maritime use).

Option 3 - Bridge/Elevated Structure

Rising from the present rail alignment north of the Cerritos Channel, the rail link would span the Cerritos Channel by means of a new high

bridge (Figure 11) and remain on elevated structure to and beyond Seaside Avenue, from which point it would descend to grade. Note that the alignment is similar to that presented in Option 2 and would impact the Matson Terminal and its future plans for expansion in a similar manner. Slight mitigation is possible here insofar as air rights only would be needed; but a potential problem to be considered in this option is the fact that the Maritime Union currently prohibits its employees from working beneath elevated structures (e.g., the conditions created by the Vincent Thomas Bridge at the Indies Terminal).

Option 4 - Tunnel/Cut

Subject to the prevailing topography, two tunnels and one cutting would be involved (Figure 12). The track would follow generally the present alignment across the Cerritos Channel, turning southwestward along the existing alignment of Brighton Beach Yard (to be abolished) and then south below Seaside Avenue, beyond which the junction to Terminal Island and the Cannery area, respectively, would be located. The object of the cut in this case is to reduce if possible the necessary tunnel length but at the same time retain grade separation for the line across Seaside Avenue and Dock Street.

Option 5 - Tunnel

The north portal of the tunnel (Figure 13) would be situated adjacent to the east arm of the East Basin, with an appropriate falling gradient from the existing level of the rail track. This tunnel would continue generally in a southwesterly direction beneath the Matson Terminal, New Dock Street, and Seaside Avenue, and rise again beyond the U.S. Navy property (proposed) to surface from the tunnel portal via a cutting to grade level in the center or southwest area of Reeves Field.

Problem Areas

There is a number of significant rail problems requiring further consideration relevant to the revised rail configuration system serving the San Pedro ports, as follows:

- the construction of a joint container distribution center located adjacent to the new automated classification yard, possibly served by a monorail connection in addition to rail and truck
- possible railroad consolidation by elimination of one route between the port area and Los Angeles, the Santa Fe Line being a possibility, subject to agreement by the A.T. & S.F. Railroad

- development of a new type dock container loading facility for unit container trains
- elimination of certain vital rail/highway grade conflicts
- determination of single/double rail track across the Cerritos Channel
- determination of single/double rail track to feed the outer harbor section of the Port of Long Beach (adjacent to Windham Avenue).

HIGHWAYS

The roadnet system serving the San Pedro ports consists of three distinct but interlinked highway systems--namely freeways, arterials, and local streets. There are many congestion areas and problem points already existing (1978). Figure 14, Highway Deficiency Map--1970, illustrates some of the problem areas.

With the projected increase in cargo to be handled by the Ports of Los Angeles and Long Beach, together with the transportation implications of future "home-port" at the Long Beach Naval Facilities, as well as its standing defense requirements, these conditions will, unless corrected, quickly become critical, causing complete blockage and stagnation. Major measures are urgent for relief of existing conditions, as well as for accommodation of future needs.

Within the immediate area, the Port of Long Beach, being the newer of the two ports, has a road network constructed to comparatively modern criteria; that of Los Angeles, the older port, was built to earlier criteria, and has few alignments that conform to modern standards.

It must be stated categorically that the roadnet system is an essential and vital primary transportation mode serving the ports and, notwithstanding any modal split that will eventually take place, it must be not only maintained but also improved. Should the "without project condition" or "null alternative" be adopted, mobility will be severely restricted, causing waste in time, money, energy, and other resources; this will be detrimental to national economic development. Ultimately the situation will be the cause of loss of business to the ports and will consequently have disastrous effects on southern California.

Freeways*

In order to utilize fully the Industrial Freeway (SR-47), it should be extended minimally to connect with the San Diego Freeway (I-405). This connection must be grade separated from the rail classification yard either vertically (on elevated structure) or horizontally (by a different route alignment) than that originally proposed by CALTRANS. A point of consideration here will be the location of the intersection point with I-405. This extension is considered essential. Consideration should also be given to extending SR-47 ultimately to connect with the Artesia Freeway (SR-91).

The capacity of the Long Beach Freeway (SR-7) should be improved by providing additional lanes and improved intersections, minimally as far as the San Diego Freeway (I-405). One additional lane per direction is the least requirement. This item is considered essential.

Extending the Harbor Freeway (SR-11) to its ultimate destination in the San Pedro area should be considered, along with the possibility of completing the Artesia (Redondo Beach) Freeway (SR-91) to connect with Harbor Freeway (SR-11) at its west end.

The completion of the east/west El Segundo/Norwalk Freeway (I-105) to connect Los Angeles International Airport and the San Gabriel Freeway (I-605) should also be considered.

Refer to Figure 20, 1974 freeway network plan.

A further recommendation is to convert Seaside Avenue/Ocean Boulevard between the Vincent Thomas and Gerald Desmond Bridges to a grade-separated freeway, which would provide additional service streets for ingress/egress for the Long Beach Naval Facilities and other installations which adjoin it. In addition to dealing with the overall problems on this sector, the arrangement will facilitate the new (grade-separated) rail alignment to serve the Reeves Field area and the New Terminal Island landfill. It will also deal with connections from the ports to the (extended) Industrial Freeway (SR-47) to the north for expeditious movement of both trucked and rail cargo.

Arterials and Surface Streets

The following is a list of recommended improvements; again, these are intended to form part of a systems approach, not necessarily to be dealt with individually.

*Harbor Freeway was redesignated an Interstate Route, and construction of Century Freeway was reactivated in October, 1978.

- Maintain a highway route across the Cerritos Channel by Badger (Henry Ford) Avenue Bridge primarily for defense purposes. The problem, options and recommended solutions have been presented in the Railroad Section. A combined fixed rail/highway bridge is recommended on a new alignment, with design criteria established for two rail tracks and four highway traffic lanes.
- Realine and construct New Dock Street on Terminal Island to fit new rail routes and the revised Seaside Avenue, as well as the realigned Badger Avenue, mentioned above.
- Improve Gaffey Street between SR-11 and Shepard Street.
- Connect Hamilton Avenue with lower 22nd Street in preparation for a Crescent Avenue (scenic) overpass separation and a new Harbor Boulevard connection to 22nd Street.
- Rebuild Harbor Boulevard between 6th and 22nd Streets.
- Connect Miner Street to Harbor Boulevard by grade separation.
- Make Crescent Avenue (scenic) into a collector highway between 21st Street and Paseo Del Mar.
- Construct Sampson Way/Nagoya Avenue as a one-way peripheral circulator in the Ports O' Call area, with a southern connection to Signal Street.
- Convert Signal Street to a secondary highway connection between 22nd Street (east end) and a new Sampson Way.
- Construct Reeves Street as a backbone secondary highway parallel to the planned new north/south railroad between New Dock Street and the (to be constructed) Terminal Island landfill. Move Navy Gate 9 to Reeves Street. Connect the Naval Facilities outer harbor circulator street to Reeves Street.
- Make Terminal Way a secondary highway parallel to Seaside Avenue.
- Interconnect Neptune Avenue, Water Street and Pegg Parkway to McFarland Avenue at Alameda/B Street as a secondary circulator.

- Improve B Street as a major highway, with ample provisions for truck turns south into the harbor/heavy industry area.
- Either provide Pacific Coast Highway with more lanes or build the Pacific Coast Freeway. Pacific Coast Highway (SR-1) in 1977 had 40,000 ADT for the four-lane stretch between the SR-7 and SR-11 Freeways. For 1990 the Los Angeles Traffic Department predicts an ADT of 43-50,000, which exceeds the volumes normally considered appropriate for a four-lane facility.
- Build frontage roads for Harbor Freeway SR-11 between I-405 and SR-91.
- Upgrade the turning capacities of the arterials triangle consisting of Anaheim Street, Badger (Henry Ford) Avenue and Alameda Street so to remove peak-hour congestion.
- Provide six traffic lanes over the Vincent Thomas Bridge. Probably this would have to be accomplished with three (11 ft.) lanes on each side of a median barrier. Roadway gradient is 6%.
- Provide five traffic lanes over the Gerald Desmond Bridge; make one or more lanes reversible for peak-hour direction. Currently, however, a proposal is in hand by the Port of Long Beach to install a median barrier, which would preclude any such arrangement.
- Review the need for bicycle routes throughout the San Pedro Port area. (The unions are opposed to these on Terminal Island.) Presently bicycles are not allowed on the Vincent Thomas/Gerald Desmond Bridges because of hazards and space assignment. If it is determined that a bicycle route is needed from Ocean Boulevard to Harbor Boulevard, it may be necessary to cantilever a bikeway along the outside of the bridge, as there is not sufficient assignable roadway for the purpose.

The Commodore Heim Bridge on the SR-47 Freeway has the following dimensions for its roadway:

35 feet, curb to median
 5 feet, raised curb median
 35 feet, median to curb
 4 feet, sidewalk, each side.

This is a dedicated freeway where no pedestrians are allowed and there is no provision for a bikeway.

- Ocean Boulevard between SR-7 and Gerald Desmond Bridge requires improved access ramps to the Port of Long Beach from the bridge. A solution to this problem is already under design by the Port of Long Beach.
- Westmont Street has been constructed between Western Avenue and Amelia Avenue to provide a connection between Gaffey Street and Western Avenue. If Westmont Street were to be continued easterly from Gaffey Street to connect with an interchange on Harbor Freeway (SR-11), it would then provide a more direct feed to the uplands of Palos Verdes. This would relieve congestion on the south end of SR-11, where it poorly mixes with Gaffey Street. The east terminus of Westmont Street should be with John Gibson Boulevard. This connection would then create a meaningful secondary arterial to satisfy the Los Angeles General Plan of Highways.

It is to be emphasized that the above is but a preliminary list of recommendations which does not attempt to be exhaustive at this stage.

Additional Problem Identification

A number of additional existing problems are identified in this preliminary phase of the San Pedro Ports transportation plan. For example, the Port of Long Beach master plan, which deals with only a five-year period (and thus is of existing and immediate concern) places the situation in perspective, as follows:

"Regional access to the Port of Long Beach is provided by three freeways: the Harbor, the Terminal Island, and the Long Beach Freeway via Harbor Scenic Drive. The primary surface street access is via Ocean Boulevard-Seaside Avenue, an east-west arterial across the combined Los Angeles-Long Beach Port area. Secondary access is provided by way of Henry Ford Avenue, Pico Avenue, and the Queens Way Bridge. All three freeways are operating at relatively high levels of service at the cordon boundaries of the study area. Because of the carrying capacities of these facilities, the north-south surface street system is operating at a very high level of service. However, many portions of the east-west street system are operating at or in excess of design capacity both east and west of the study area. It is estimated that the trucks comprise 7.5% of the total traffic flow during peak commuter periods."

Some other existing problems of major concern in the primary transportation plan area are enumerated below, but the list is not intended to be all embracing.

The northern end of Gaffey Street, San Pedro, presently accepts all traffic exiting the south end of SR-11 (Harbor Freeway). Gaffey Street serves a considerable portion of the San Pedro commercial area along its frontage. CALTRANS is responsible for this contiguous portion of the Harbor Freeway (SR-11) from 9th Street north to the freeway. Figure 15 shows that this freeway portion is depicted in the "Route Not Adopted--Exact Location Not Determined" category. This section of Gaffey Street lacks capacity (44,000 in 1970 and 63,000 ADT projected in 1990) to handle the traffic safely, especially during peak hours.

At the triangle of arterials formed by Anaheim Street, Badger (Henry Ford) Avenue and Alameda Street, considerable congestion relative to capacity is occurring during peak hours. Because the Industrial Freeway (SR-47) is incomplete, considerable truck traffic utilizes Alameda Street as a throughway to the harbor. At this location, Anaheim Street experienced an ADT of 32,000 during 1970, and an ADT of 54,000 is expected in 1990 (City of Los Angeles).

The junction between Seaside Avenue and the toll plaza of the Vincent Thomas Bridge is dangerous and restrictive. Considerable problems exist in making effective improvements other than by grade separation. (This situation is of special concern to truckers, a large number of which regularly traverse this intersection.)

Willow Street is presently restricted (by law) to trucks, and this causes difficulties in exiting the port area. Relief from this problem is needed.

Seaside Avenue (Los Angeles)/Ocean Boulevard (Long Beach) between the bridges (Vincent Thomas in Los Angeles and Gerald Desmond in Long Beach) currently carries an ADT of 27,000, with a projected 45,000 in 1990, even with SR-47 Freeway (if built) in parallel carrying an ADT of 32,000.

With future rail tracks anticipated to cross this highway at grade, an untenable situation could develop from both capacity and safety standpoints. A possible solution is shown in Figure 16.

Even so, Seaside Avenue is a particularly critical arterial, serving, as it does, both ports and the Naval Facilities. The latter has particular problems relative to ingress/egress, especially at morning and evening peaks.

CALTRANS prepared a Seaside Avenue study plan in January 1973, which proposed to:

- widen Seaside Avenue to a full six lanes (a)*

*letters keyed to Figure 16.

- provide dual left turns to the Commodore Heim Bridge (b)
- provide dual left turns to Gate 1 - Naval Facilities (c)
- provide ultimately an improved four-way intersection at Gate 9 - Naval Facilities and, in the meantime, make Reeves Street tee to the south, with a flyover from New Dock Street (d)
- provide an improved Ramp C along the south side of the Vincent Thomas Bridge connecting Ferry Street and the toll plaza
- close the ramp from Seaside Avenue to Toll Plaza (f)
- construct an improved ramp to the bridge (g)
- rework approaches to the toll plaza to provide for right turns only (h)
- rework Seaside Avenue west of Ferry Street to provide a better functioning highway split (not shown).

On September 1, 1970, there was filed with the California Secretary of State Assembly Concurrent Resolution No. 172 relative to upgrading an inadequate Seaside Avenue. This sought to improve the connections between the bridges leading to Terminal Island and to serve the harbor area with better road facilities.

A serious problem exists in the bottleneck leading to the outer harbor section of the Port of Long Beach, between Pier J and the Los Angeles River. The only protection is the provision of stop signs in all directions, which are inadequate from a safety point of view and have a delay effect on all traffic. The situation is worsened still by the fact that a single rail track, providing the only access to the outer harbor of the Port of Long Beach, is situated across the center of the intersection. Remedial measures for this problem area are urgent, and a solution is currently under design by the Port of Long Beach.

The streets of the San Pedro area, in addition to Gaffey Street mentioned above, need improvement to meet the planned highway circulation of the General Plan of Los Angeles. In particular the deficiencies are:

- general circulation, connections and capacity
- port-related movements
- scenic, residential and business activity.

The depiction of these problems is presented in Figures 17 and 18.

The Port of Long Beach has recognized the problem that traffic moving westward toward the Gerald Desmond Bridge has difficulty in reaching that highway due to the number of turnings and intersections which must be encountered before doing so. The Port of Long Beach has plans to improve the connections between Ocean Boulevard and this section of the port, in order to allow better ingress to and egress from the area as a whole.

The port administration is also experiencing minor circulation problems within the outer harbor itself. Panorama Drive has been temporarily divided in order to improve rail access from the Pier A yard to the grain terminal and bulk loader, respectively, and to reduce the hazards of road traffic moving in this area.

Problems of concern to the Long Beach Naval Facilities relate to the large amount of traffic generated there which proceeds to Long Beach over the Gerald Desmond Bridge. The authorities would like to see duo-directional lane control established over the bridge for the peak periods; however, the construction of the median barrier across the bridge will prevent this from being instituted. In connection with this scheme, they would also like to incorporate additional exits to the highway system from the Facilities in order to avoid having all cars enter and exit the parking lot at one location. (This is complicated by the arrival and departure of all personnel within short period of time in the morning and evening peaks). Pier E, which lies adjacent to the Port of Long Beach and the Naval Facilities, is periodically used for the unloading of new automobiles; this usage must be borne in mind in an overall roadnet plan for the area.

Bordering Seaside Avenue, the Long Beach Naval Facilities is entered/exited through a number of gates.

Gate 1 is the main point of access for the Naval Support Facility. Users of Gate 1 include most vehicular traffic destined for the administrative offices, medical facilities, public works offices, or the centrally located enlisted men's housing. This gate also handles the majority of pedestrians entering the facility as well as all visitors requiring passes. This gate remains open at all hours and absorbs additional traffic during the hours that Gate 9 is closed.

Gate 2 is the primary access for the Supply Center Annex. This is the principal point of entry for truck traffic making deliveries and collections. Rush-hour traffic via this gate is predominantly civilian employees. The circulation pattern is not directly related to the location of the gate or its adjacent land uses. This gate is normally closed after the late afternoon peak and remains closed until just prior to the morning rush. Late deliveries or other traffic is directed to Gate 5 during the period when Gate 2 is closed.

Gate 3 is an alternative access to the central area of the complex, which serves such diverse facilities as the medical center, procurement and administrative offices.

Gate 5 is the principal entry to the Facilities. Most traffic destined for the industrial area as well as the administration building enters here. Military personnel assigned to ships in repair augment the flow of traffic through this gate. Immediately outside Gate 5 is the Facilities personnel office. Gate 5 is normally open 24 hours and, as Gate 1, handles traffic destined for other areas of the complex when Gates 2 and 3 and Skipjack Avenue are closed.

Gate 9 handles entry to and exit from the naval complex on the west side, and serves several administrative buildings in that area, such as the supply center, security services, and facilities on the mole. It is adjacent to First Street and is periodically closed.

Gate 15 lies at the east end of the complex, adjacent to Skipjack Avenue. It primarily services the shippers, and there is a heavy concentration of workers, as they use this gate to move to and from work. Heavy congestion, therefore, takes place at peak hours of the working day.

All these gates share a common problem of insufficient auto stacking for ingress and egress past security.

Of further importance to the Long Beach Naval Facilities is the need to retain the surface street across Badger Avenue Bridge, open mainly for defense purposes, but plans of the Port of Los Angeles call for continued closure.

Recommendations

Resulting from the above analysis of the roadnet system and an appreciation of both the immediate traffic problems (which worsen daily), as well as the long-range requirements for servicing the total port area to the year 2000, certain initial recommendations have been made. These are generally illustrated in Figure 19. It is emphasized, however, that the individual items should form part of a systems approach; unless they are dealt with on a regional basis, isolated or spot improvements may well be counterproductive.

Coordination

The extent of the complicated coordination effort required to finalize the roadnet construction and improvements is shown by the number of different independent agencies likely to be involved. These are:

Port of Los Angeles
Port of Long Beach

Long Beach Naval Facilities
California Transportation Commission
State Department of Transportation (CALTRANS)
Los Angeles County Transportation Commission
City of Los Angeles
County of Los Angeles
City of Long Beach
Southern California Association of Governments
Orange County Transportation Commission
South Coast Regional Commission
(Section of the California Coastal Zone Commission)
The three mainline railroads
City of San Pedro
City of Wilmington
City of Carson
Harbor City
Private agencies (e.g. Trucking Association, The Los Angeles
Steamship Association, Automobile Club, etc.)
Southern California Rapid Transit District
Long Beach Public Transportation Company
The Unions.

Non-port-related Services

This document deals with only port-related traffic and services; it does not address highways serving adjacent lands and their needs. The traffic analyses and studies recommended in future actions should also, advisedly, include non-port requirements to ensure that implementation includes total movement of all types of vehicles using the facilities without congestion, and without overlapping of differing applications.

Triple-trailer Operations

Although not yet legal in the State of California, triple-trailer operations are currently authorized over designated routes in the States of Utah, Nevada, Idaho, Oregon and over a short segment of I-15 in Arizona. An expansion of their use is currently being considered in Arizona, New Mexico, Washington and Wyoming.

In the event of the legalization of triple-trailer operations in California, the roadnet system serving the San Pedro Ports would undoubtedly be affected according to circumstances.

A triple-trailer combination consists of one tractor and three semi-trailers, each semi-trailer being approximately 27 feet in length. The overall length of the triple-trailer combination is usually about 96 feet but it may run as high as 105 feet, depending on the type of

tractor used. Most states authorizing triple-trailer operations also permit other multiple-trailer combinations, such as two 40-foot trailers pulled in tandem. Still other states, such as Wyoming, allow one 27-foot trailer to be pulled in tandem with a 40- or 45-foot trailer. New Mexico is currently testing triple-trailer combinations on two major routes.

One trucking company has been operating triples for approximately 16 years in the State of Nevada. Until 1975, those operations were confined to state highways. In 1975, triple trailer operations on the interstate system commenced in the States of Utah, Nevada, Idaho and Oregon. Since that time (April 30, 1975) the company has accumulated over nine million miles of triple-trailer experience, during which period there has never been a major accident (or a death or serious injury). Fuel savings have averaged 27% compared to a doubles operation, and the company claims to have saved over 800,000 gallons of diesel fuel.

Productivity of truck transportation has been increasing steadily over the years since the oil embargo of 1973. Improvements include the use of air deflectors, thermodynamic fans, radial tires, reduced size in fuel injectors, fuel pump governors and reduced speed.

These technical improvements combined have created some 13% betterment. However, the most dramatic improvement has been effected by the use of triple trailers, which, on their own account, have created the combined savings of 27% in fuel and 40% in overall potential productivity, and this without any decrease in employment.

Triple trailers haul virtually the same type of commodity as other combinations, with the exception that lighter or more bulky cargoes will often be placed into the triple-trailer combination.

The safety record of triples operations is better than any other combination of record. Triple trailers have remarkable stability in braking and do not jackknife. Individual axle weights with triples are no greater but average less than other combinations.

It is therefore claimed that the use of triple trailers has provided a unique breakthrough in fuel economy, safety and overall productivity. Triples eliminate every third trip, and therefore exposure to road wear and accident is further reduced.

Questions now arise regarding the impact (if any) that triple-trailer operation will have on the San Pedro Ports transportation plan for the year 2000 and what action (if any) should be taken. From the perspective of the 1978 status and planning, the following questions are now addressed.

Will there be any impact at all? In view of the significant breakthrough in energy savings claimed for triples, the greatly improved productivity they achieve, and the fact that they are being seriously considered in neighboring states, it is believed that by the year 2000 they will have become legal in California. As the major west-coast port complex serving California and the midwest by truck, the operation of triples in connection with the San Pedro Ports is believed to be virtually certain. Their impact will therefore be definite, and provision for them should be made within the plan.

What provisions should be made? It is believed that a relatively low proportion of total truck traffic will be handled by triples--that involving major trunk haul where economies (to the trucking companies) can be realized. Therefore, the following effects on previous recommendations in respect of the roadnet are anticipated.

Freeways--None. SR-47 must in any event be completed; triples will use this route to the benefit of others. The capacity of SR-7 presently requires to be increased; triples will not alter this need. The recommendation to review the benefits expected from the development/completion of SR-91, SR-11, and I-105 remains unchanged.

Arterials and Local Streets--The planned construction and improvements recommended in this report will not be significantly affected by triples; they have been set forth to deal with all types of highway vehicles, including trucks. Triples will generally use arterials in entering and exiting the port area and, like other trucks (single or double), will tend to avoid commercial and shopping areas and the delays inherent in such routes. However, when engineering design of the arterials and the associated problem points is undertaken, due regard will have to be paid to the efficacious operation of triples (turning circles, for example), as well as all other types of vehicles and their formation using the system.

Facilities--Some terminals and highways will be affected by triple-trailer operation in the port area. These include modification of some roads serving docks and warehouses, loading interface sites, container transfer equipment, and assembly bays. Engineering design work should include triple-trailer options.

State Cargo Plans

As the State Department of Transportation (CALTRANS) has direct responsibility for parts of the San Pedro Ports roadnet, it is assumed that the primary thrust of cargo planning by that authority would be related to the highways. This section of the report is therefore used to state that CALTRANS has no plans in the immediate future for cargo movement in the San Pedro Ports area.

TRANSIT

Since the cessation of service by the Pacific Electric Railway in the mid 1950's, the primary mode for personnel travel has been the automobile, supplemented by limited bus service. Circulation within the ports themselves is by means of private automobiles, taxis and buses. There are two agencies that provide public transportation to the port: the Long Beach Public Transportation Company and the Southern California Rapid Transit District. There are, at present, no plans to increase service by either agency. On the contrary, Southern California Rapid Transit District intends to reduce services to the area because of insufficient funding and revenues.

There have been numerous plans and proposals for establishing a modern mass-transit system to serve Los Angeles County. To date, none of these propositions has gained voter approval; the most recent is the "Sunset Coast Line," which was rejected at the polls in June 1976. A reduced version of the "Sunset Coast Line," called the "Sunset Limited," was a question on the November 1978 ballot. However, this plan does not provide a direct link to the primary port area.

CALTRANS is also preparing a "bus-on-freeway" concept for mass rapid transit. At this writing, copies of this proposal are not available.

The plan under study for utilizing the Los Angeles River flood control channel as a transportation corridor is addressed in the Waterways Section of this report.

During most of the working day (based upon average theoretical capacities), the existing road network handles traffic without undue congestion. However, observations at morning and afternoon peak hours indicate the existence of congested locations. The City of Long Beach master plan states:

"Peak-hour surveillance activities were conducted to obtain additional information regarding existing operational problems. The locations with the most serious peak-hour congestion were centered in the high employment concentration area on Terminal Island. During the afternoon peak period, the intersections of Ocean Boulevard/Terminal Island Freeway terminus, Seaside Avenue/Vincent Thomas Bridge terminus, Henry Ford Avenue/Anaheim Street, and the Ocean Boulevard interchange with Gate 5 of the Long Beach Naval Shipyard are very congested with heavy vehicular delays."

Further automobile congestion occurs at the connection between Seaside Avenue and the Long Beach Naval Facilities, a situation which extends across the Gerald Desmond Bridge and other arterials and freeways handling the Facilities job-related traffic.

Future growth of port activity will further aggravate the peak-hour congestion and require additional roadway improvements and/or alternate modes for workday circulation.

There are various "stop-gap" measures in operation that may be applied to alleviate the existing road network overburden, such as Commuter Computer, Dial-Your-Ride, Van Pool, etc. It has also been suggested that the affected unions negotiate future contracts emphasizing rotating shift work so that port businesses change to a 24-hour day/7-day week operation. This would place cargo transfer operations more in line with maritime, railroad, and trucking operations. Another suggestion is that port businesses provide parking facilities outside the port area, with private shuttle buses to transport employees to and from the ports. These alternatives are short-term measures that could alleviate peak-hour congestion until such time as a permanent solution can be implemented.

With no definitive plan for a county-wide mass-transit system, proposing an interfacing transit distribution system would be rather academic. However, at the appropriate point in time, consideration will have to be given to such a facility to interface with both the line-haul bus and the mass-rapid-transit systems proposed by SCRTD to coincide with their scheduled implementation program. The actual type or types may vary depending on application, operating in a scheduled mode in peak hours and converting to an on-demand operation in the off-peak hours, to connect the following major generators of traffic:

- San Pedro residential area
- Long Beach residential area
- San Pedro recreational area
- Long Beach business area
- Wilmington business and residential areas
- Harbor City
- Classification yard tower (see Railroads Alternative)
- Long Beach Port (Channels 2 and 3)
- Long Beach Port administrative offices
- Queen Mary
- Long Beach Naval Facilities
- Passenger terminus
- Cannery area
- U. S. Government Departments area (Coast Guard, Immigration and Naturalization, Justice, Customs)
- Other commercial areas within the existing or developing ports.

Existing and provisional route delineation and station locations are shown on Figure 21. The mode or modes have not been identified pending further development of requirements for both movement and technical application. Several distributor/circulation systems worthy of con-

sideration at the appropriate time are listed below; others may emerge during the ensuing period.

- Minibus on existing streets
- Group Rapid Transit (GRT) (i.e., small vehicles on dedicated guideways)
- Personal Rapid Transit (PRT) (i.e., individual vehicles on dedicated guideway, on demand, direct origin/destination)
- Para-transit (i.e., any form of shared facility such as taxis, jitneys, dial-a-bus, etc.)
- Shuttle and feeder links (taking the form of minibus, tram, small vehicle on guideway, and/or aerial ropeway, water-taxi, water ferry, etc.).

It is also to be noted that, bearing in mind the overall plan for the (revised) railroad configuration throughout the harbor-related area, abandoned or modified rail rights of way should be considered suitable for transit; this is particularly so in case of vehicles on a captive guideway such as steel wheel/steel rail, small vehicle systems, PRT, and the like, running on grade or elevated.

WATERWAYS

As an alternative solution to the problem of providing adequate surface transportation of goods and personnel to address the anticipated needs of the year 2,000 and beyond, the utilization of existing waterways as a mode within the overall transportation complex of port activities merits an objective analysis.

Nationwide, there has been a continuing emphasis on the part of planners to increase the use of waterways as transportation corridors, thus effectively relieving pressures on the overburdened roadnet system. Encouragingly, waterways (both inland and oceanic) are not extensively used, and they provide an existing right of way without comparatively high capital costs. In December 1971, Dr. Roman Krzyckowski of Interplan Corporation prepared a three-volume report for the Urban Mass Transportation Administration, entitled, "Over-the-water Program Design." The primary thrust of this effort deals with transportation of people rather than cargo; however, it also demonstrates the underutilization of existing water transportation corridors in some 30 cities throughout the United States.

On October 24, 1973, the City of New York, with the cooperation of the U. S. Department of Transportation, the British Department of Trade and Industry and the British Ministry of Defense, undertook a demon-

stration of an air-cushion vehicle operating in the inland waterways of that city. A two-volume report on this demonstration was released in February 1975. Subsequently, UMTA approved a grant of \$995,000 for an 18-month testing program of operating high speed rigid-sidewall surface effect ships. In the winter 1977 edition of "Transportation U.S.A.," published by the U. S. Department of Transportation, there appears an article called, "Express Buses on the Water" written by Mr. Edward O'Hara. He quotes the then UMTA Administrator, Robert E. Patricelli, as having said, "By utilizing the potential transportation capabilities of waterways in congested urban areas such as New York and northern New Jersey, we may be able to provide convenient and cost-efficient transit and, at the same time, relieve the strain on crowded highways and transit systems." A similar opinion was expressed by Mr. James Bautz, Transportation Program Manager for UMTA's Office of Service and Methods Demonstration. The most recent demonstration of continued government interest in high-speed waterways transit occurred in June 1978, when the House Transportation Committee recommended the appropriation of \$30,000,000 to initiate the "Jetfoil" program in the New York City area.

The feasibility of utilizing the Los Angeles River as a transportation corridor for autos, buses and trucks, was presented in a report prepared by the California Department of Transportation (CALTRANS) in May 1972. Since the initial report was presented, studies have been performed by other concerned agencies. As of April 1978, the status of potential implementation of this concept is as follows.

- CALTRANS has completed engineering studies regarding the potential utilization of this corridor for truck traffic from the port area to the Golden State Freeway.
- Southern California Rapid Transit District is interested in utilizing the Los Angeles River as well as other flood control channels for transportation corridors.
- The U.S. Corps of Engineers is evaluating the feasibility of using the Los Angeles River as a transportation corridor without compromising its primary function.

Upon completion of the studies currently in progress, the aforementioned agencies will hold additional meetings concerning the transportation potential of this waterway.

The base condition evaluation assumes that key elements of the master plan of the San Pedro Ports, such as channel dredging and increased landfill areas, will be developed and that they therefore form an integral part of the base condition. Current utilization of waterways will increase because of rising amounts of cargo handled through the ports. However, this increased utilization will exacerbate the demands on the roadnet and railroad systems.

Current utilization of waterways within the primary study area consists of commercial vessels, service ships, barges, amphibious aircraft takeoff and landing, and recreational boating. With the exception of sightseeing boats and navy shore boats, there are no regularly scheduled waterway facilities in operation for transporting personnel. The Port of Los Angeles draft master plan prepared in 1975 suggests (Pages III-84 and III-85) the use of surface-effect ships for inter-coastal passenger and freight traffic, and the Land Transportation Overview of the same date (Page 84) contains a recommendation for future ferry and water-taxi services. The City of Long Beach master plan (1978) proposes a boat shuttle along the downtown shoreline to ferry passengers across Queensway Bay. None of these proposals have an implementation commitment and therefore will not be considered as part of the base condition.

Shallow draft ships and barges have limited access to the Dominguez and Los Angeles River flood-control channels during periods of favorable tide. Barge-carrying vessels prefer to load and unload barges inside the breakwater. LASH-type operations are expected to increase two to three times over current levels by the year 2000.

The potential utilization of waterways for transport is also shown in Figure 21. Applications are: circulation of cargo and personnel within the San Pedro Bay, movement of cargo and personnel along the coast of Southern California, and carriage of cargo and personnel inland to and from San Pedro Bay, utilizing the flood-control channels as guideways.

It should be noted that the coastal waterway parallels the San Diego Freeway (I-405), while the Los Angeles River parallels the Long Beach Freeway (SR-7). Both of these highways are overburdened.

There are numerous variations of current marine transport technology; however, the basic type applicable for the utilization of waterways transport are:

- Displacement Hulls
- Planing Hulls
- Hydrofoils
- Air-cushion Vehicles
- Surface-effect Ships.

Each of the craft has limitations with regard to potential utilization of waterways. The tables below show the suitability (s) or unsuitability (u) for each of the basic types and the general characteristics, respectively.

VESSEL USE

Type of Vessel	San Pedro Bay		Coastal Waterway		Flood Control Channel	
	Cargo	Transit	Cargo	Transit	Cargo	Transit
Displacement Hull	s	s	s	u	u	u
Planing Hull	s	s	s	s	u	u
Hydrofoil	s	s	s	s	u	u
Air-cushion Vehicles	s	s	s	s	s	s
Surface-effect Ships	s	s	s	s	u	u

MARINE CRAFT GENERAL CHARACTERISTICS

Type	HP/Gross Ton Knot	Ride	Cost - \$/Payload Ton Knot
Advanced Planing Hull	1.2 to 1.5	Poor	1,800 to 2,000
Hydrofoil	1.25	Very Good	8,000 to 10,000
ACV	1.3 to 2.0*	Good	2,000 to 3,000
SES	0.8 to 1.0*	Good	1,700 to 1,900

*includes cushion power

The displacement hull is the most common of all current types of marine vessels. Its limitation is speed, and minimum drafts are essential. Depending on the configuration of the hull, design speeds are from 10 to 30 knots. Attempts to operate this type of vessel at speeds above the hull-design speed result in excessive power requirements. Because of limited speed, minimum draft requirements, and pitch and roll encountered in waves above four feet in height, this type of vessel is considered to be unsuitable for transit operations along coastal waterways.

The planing hull differs from the displacement hull in that, with increased speed, the bow of the vessel lifts out of the water, reducing resistance and requiring less power at higher speeds. Although speed capabilities are greater and minimum drafts less than those of displacement hulls, this type of vessel is considered to be unsuitable for coastal waterway transit because of poor ride characteristics in waves greater than four feet. Moderate performance planing boats are a proven, state-of-the-art technology and are available at a reasonable cost.

Hydrofoils are, as the name implies, vessels with hydraulic foils or wings attached to the hull. As speed increases, the uplift on the foils raises the hull clear of the water, thus greatly reducing friction and resistance. Either surface piercing or fully submerged, these units provide improved efficiency over planing or displacement hulls. In rough water, in the fully submerged position, they exhibit smoother ride qualities than the surface piercing type. The fully submerged retractable foil, such as the Boeing "Jetfoil," offers a good ride quality at a speed of 43 knots in seas with waves of four feet or more. Hydrofoils are, however, vulnerable to floating debris at high speeds. For docking and other low-speed maneuvers, the Boeing model retracts its foils, allowing the vessel to operate in drafts as shallow as six feet. These characteristics make a retractable hydrofoil suitable for transit operations along coastal waterways. While not as widely used as planing and displacement ships, hydrofoils are in service worldwide and are available in a variety of sizes.

The air-cushion vehicle (ACV) is an air-supported craft in which the air cushion is contained by a flexible seal or skirt completely around its periphery. More recent in technology than other types of vessels, ACV's offer high speed at low drag. They offer a unique amphibious capability; however, they are difficult to control because of the lack of surface contact. The technology required to overcome the problem of directional stability has been developed, but there is not presently an "over-the-counter" ACV available to meet the requirements of operating in the Los Angeles River flood-control channel or the primary study area. A detailed analysis of the flood-control channel and the use of the ACV would be required to implement this service, which nonetheless offers considerable promise for cargo and personnel. ACV's capable of operations within the bay and along coastal waterways are commercially available. ACV's are successfully

accomplishing both military and commercial missions in various parts of the world; the most notable of these is the regular ferry operations across the English Channel.

Figure 22 shows a concept design for an ACV terminal.

The surface-effect ship (SES) is a craft closely related to the ACV which has a rigid structure to contain the air cushion along the sides and uses catamaran-style side hulls to reduce lift power requirements and permit the use of efficient water-propulsion systems. The side hulls also provide hydrodynamic forces for stability and maneuvering.

The cushion system isolates the main hull from the surface to make high-speed operation both efficient and comfortable over waves.

Several test crafts have undergone extensive trials under the U. S. Navy's SES development program; these include the SES-100B, which has achieved speeds in excess of 100 mph.

PIPELINES

Pipelines are an essential component in the overall transportation concept of the San Pedro ports area. The pipelines consist of loading and unloading connections for shore-to-ship/ship-to-shore installations; gas and liquid conduits from dockside to storage facilities; and intermediate or long-distance transmission conveyors for petroleum products, industrial gases, and coal or ore slurries. In addition to these designated process pipelines, countless intermingling new and existing domestic, fire and industrial water lines; waste-water lines; storm water lines; and natural gas pipelines criss-cross throughout the harbor area.

New pipelines within the primary area must be totally integrated into the transportation plan. It is recommended that consideration immediately be given to the collation of pipeline easement, rail and other transport rights of way, bridges, causeways, and marine pipeways in the form of a master pipeway plan, for gradual adoption by gradually freeing the rights-of-way required and earmarking them for this specific purpose. Existing pipeline bottlenecks at the Terminal Island railroad bridge and Cerritos Channel crossing areas, and the new potential bottleneck on the utility easement to Pier J, must be reviewed and design relief provided.

Existing pipeline rights of way are at a premium along the eastern side of the Long Beach Harbor District. The possibility of six new berths south of Pier J with their attendant six 48-inch diameter pipelines requires immediate total assessment to reduce adverse impacts on port traffic and tenant access. One 48-inch pipe requires a trench 10 feet

wide and at least 12 feet deep and a minimum 8 feet of cover. To reduce the congestion in the rights of way, consideration should be given to the installation of petroleum storage/surge tanks on Pier J. Although marine pipelines are generally considered unsatisfactory from an environmental and maintenance standpoint, routes through the main channel and up the Los Angeles River are possible as a last resort.

The pipeline to serve the new SOHIO Terminal, which will transmit crude oil from the Port of Long Beach to Midland, Texas, has already been engineered. The port states that it was possible to find a pipeway for this pipeline only by an indirect route meandering throughout the port area. As in most of the San Pedro ports areas, specific dedicated pipeway routes have not been delineated; pipelines are routed wherever it is possible to do so in regard to existing facilities.

More extensive research to relieve the Terminal Island and Cerritos Channel pipeline confluence should include a restudy of a pipe tunnel under the channel. The tunnel approach, although expensive, is more realistic from an engineering point of view than the placement of one pipeline over another in the same trench. This design approach must be coordinated with the anticipated dredging of the channel. The replacement of abandoned lines and the installation of new lines should be master planned by a designated agency which is able to interface with both public and private agencies, particularly the Ports of Los Angeles and Long Beach.

Once the pipelines have exited the immediate harbor areas, detailed considerations should be given to utilizing easements along the Dominguez Flood Control Channel and the Los Angeles River to provide access to the Southern California pipeline networks.

Figure 23 indicates the major pipeline routes and the known pipeline bottleneck areas within the San Pedro ports primary study area.

One item to be investigated further is the impact of existing bunkering fuel pipelines to supply the additional 25 to 30 ships to be "homeported" at the Long Beach Naval Facilities. At this writing the adequacy of the existing system is not fully known.

In some cases, an alternative to liquid bulk transportation by pipeline is the use of unit tank car trains by rail. In view of the heavy volume of liquid energy imported through the Los Angeles and Long Beach ports, a relief measure worth investigating appears to be transportation of these products by rail. In this regard, new terminals and transfer facilities would be needed, especially in the port area, but this may still prove to be cost effective against new pipelines for long-distance haulage, particularly in view of the rail modernization plan, which would facilitate car handling from the docks to distant destinations in unit train formation.

Pipelines are, of course, suitable for conveyance of other substances, such as coal and ores. This alternative is not considered valid for the transportation plan for the San Pedro ports mainly because of the need to construct, in the already congested and land-scarce area, the beneficiation plants for reconversion from liquid to solid and vice-versa.

FLOOD-CONTROL CHANNELS

Flood control for this region had its start in June 1915, when the Los Angeles County Flood Control District was established by an Act of the California State Legislature. A comprehensive plan for flood control, adopted by the County Board of Supervisors in 1931, has been used by both the District and the U.S. Army Corps of Engineers in developing the local flood control program.

The Corps of Engineers became involved in the local flood-control program largely due to the economic depression of the 1930's. Projects on major streams were placed under their direction, while upstream work on headwaters and small tributaries was assigned to the Department of Agriculture, with the Flood Control District being designated as the responsible local agency.

The principal drainage systems into the San Pedro Harbor area are the Los Angeles River, which drains an 832-square-mile basin, and the Dominguez Channel, an 18.5-mile-long structure, which drains a highly urbanized 80 square-mile area west of the Los Angeles River Basin. Figure 24 shows the routes. Permanent channel improvements for the Los Angeles River have been constructed by the Corps of Engineers under legislation enacted by Congress in 1936. The Dominguez Channel, on the other hand, was planned (in 1941) and constructed by the Los Angeles County Flood Control District (ultimately completed in 1967).

The Los Angeles River

This 50-mile flood-control channel empties into the San Pedro Bay east of Long Beach Harbor. Although it was primarily built as a flood-control channel, a secondary function is water conservation. It forms one element of a comprehensive flood-control project designed to protect vast areas of Los Angeles County. Existence of the Los Angeles River is, therefore, a vital function not only in protection against flooding but also in ensuring that all areas of Southern California are in fact habitable and protected from the unpredictability of the river.

Over the years many suggestions have been made for the use of the Los Angeles River. These include such things as a freeway in its center, defense plants over the top of it, runways for an additional airport, and damming it in order to operate a ferry boat service. Further suggestions include a monorail route and a rowing course for the 1984 Olympiad. All these suggestions are considered to be impractical.

In May 1972, the California Department of Transportation prepared a report on the feasibility of utilizing the bottom of the Los Angeles River as a roadway for autos, buses, and trucks. Their preliminary investigation determined that a 13-mile section of channel between Bandini and Del Amo Boulevards (which generally parallels the Long Beach Freeway) was the most appropriate section to use for experimentation with this type of route. In January 1976 CALTRANS prepared a report on using the channel (specifically from Imperial Highway in South Gate to the central business district) for buses only. The report indicated that the channel would be usable about 220 working days per year.

Subsequently, CALTRANS staff members have discussed the following uses for the Los Angeles River:

- an alternate route for carpools, trucks and buses
- an SCRTD busway
- an auto corridor (following a field auto trip to test rideability)
- a truck route between the San Pedro Port area to the Golden State Freeway.

The Dominguez Channel

Figure 25 shows typical cross-sections of this channel. Previous activity surrounding it is described in a research effort by California State College, Dominguez Hills (CSCDH) in November 1976, entitled "Reclaimed Water in a Man-Made River: The Dominguez Channel-Hyperion Project." It has this to say:

"The Dominguez Channel was built in sections by various contractors and was finally completed in March 1967, at a cost of \$32,103,000 (compared to the 1941 estimate of \$7,588,400). Its 18.2 mile length is divided into three different channel forms which correspond to the stream order and to the tidal nature of the water in lower reaches, i.e., from Vermont Avenue and Artesia Boulevard south to the Harbor. This construction allows for a geometric increase in flood capacity up to the fifty-year flood level and gives the channel a maximum flow capacity of 16,800 cu. ft./sec. in the lower reaches.

"The early student research at CSCDH concentrated on the present effect of the channel and on the communities through which it runs and on the citizens of those communities. The general conclusions were that the channel is not a barrier to transportation along the major arteries for bridges carry four railroad lines, two freeways, and fourteen major streets across it. Local neighborhood streets are cut by the channel causing headaches for public safety

and works agencies, as well as the residents of the area. While realizing the valuable purpose of the Dominguez Channel, local residents find the interruption of neighborhood streets an annoyance but have adapted their personnel circulation patterns to circumvent this local barrier.

"Citizens do find the channel aesthetically unpleasing, however, and it is true that the Flood Control District having only a single purpose in mind made no attempt to create anything other than a flood control channel meeting the mathematical requirements to contain a 50-year flood. The channel is, therefore, an ugly concrete ditch or clay canal lined with ubiquitous chain-link fence. The residents' reaction to this monstrosity is to treat it as such, so excess garbage is deposited there and local stables use it as a dung disposal channel. Until very recently the petrochemical industries in the lower (Wilmington) tidal section of the channel were dumping industrial wastes into the channel, polluting both that section and much of Los Angeles Harbor. Strong action by the water pollution authorities in collaboration with the Harbor Department has largely abated this nuisance.

"As things now stand, the Channel itself is a hazard because the garbage, dung and stagnant residual water, north of tidal activity in the channel, creating a fertile breeding ground for disease-carrying mosquitos and other insects. The chainlink fence with its "No Trespassing" signs, built to meet public liability insurance requirements, are a magnet for small boys and their adolescent brothers who find the channel an ideal place for skate-boarding, fishing, smoking and other such nefarious activities that the Sheriff's Department terms "gang activities." The danger to these youngsters from injury while negotiating the fence, from falling fourteen feet or more into the concrete channel floor or from being caught in flood water, is great. Public safety agencies claim that access to the channel is very difficult, delaying rescue and medical care, and thereby possibly adding to the severity of the injury."

Joint-Use Overview

Joint use of existing right-of-way corridors, should various critical points be resolved environmentally and economically, could ultimately provide service from the harbor area to two of the important sectors of the Los Angeles metropolitan area, namely, the Los Angeles International Airport by the Dominguez Channel, and downtown Los Angeles by the Los Angeles River.

Use of the Los Angeles River

Practical use of the Los Angeles River Flood-Control channel must be narrowed down to projects which can be developed irrespective of water levels and the need to dam the river which would thereby impede water flow when the need is greatest. These evolve into the following possibilities.

The channel must be useable for transportation, irrespective of the content of the water or its level. This must be done by means of a vehicle which can traverse the right of way under any condition, and the only type that meets this criterion is the air-cushion vehicle. This vehicle could be used over the Los Angeles River for cargo and/or personnel. Using it for cargo handling could give rise to the development of facilities (manufacturing, warehousing, processing, or break bulk) placed along its banks which would interface with other transportation modes (rail, highway). Other sections of this report discuss the use of ACV's and the action that would need to be taken in the event of their using certain sections of the flood-control channels. For personnel use, interchange stations would have to be built; however, these could be of a very simple nature, since ACV's are capable of traversing any terrain, basically needing only space where they can deviate from the running channel into a bay for loading and unloading. The Los Angeles River is recommended for development as an ACV right-of-way because it traverses areas of high density industrial and residential use.

Although remote, the possibility of using the Los Angeles River for conventional transit still remains viable. This could be in the form of heavy rail or light rail tracks either running on its banks or built on a guideway elevated on an archway-type structure over the continuous length of the channel. This would be a very high cost item and would be difficult to construct; a further problem arising here is the height of the transit way over the intersections with roads and other facilities, which might cause the transit tracks to be elevated to perhaps some 60 feet above grade level. A further possibility would be the monorail system. Conventional monorails have not yet found favor in an urban situation; however, there is now available a true monorail which is considerably more simple and of lighter construction than the conventional saddlebag or underslung types, and it has an improved, quick-acting switch. The monorail in question is elevated above ground on a single rail mounted on a single concrete I-beam and has light elevated structures. It is therefore more suitable for riverbank construction in preference to better known systems. The lightness and simplicity of this system may thus be a new approach to the utilization of the Los Angeles River embankments for transit purposes. The type of monorail envisaged is shown in Figure 26.

There is no question that airspace over the Los Angeles River offers tremendous opportunity. This could be utilized for such items as linear parks, recreational facilities, car parks in heavily industrialized areas, apartments and other residential facilities, industrial plants, and warehousing. Employment of this airspace in these situations has the advantage of being adaptable to suit the particular areas through which the Los Angeles River runs. The airspace used in this case could therefore be fragmented according to city, county or other local needs.

Flood-control channels generally are suitable for use for pipeways. The Los Angeles River is such a case and it provides an excellent pipeway right of way. This possibility should be investigated more fully when the overall master plan for pipeways/pipelines for the San Pedro ports area is investigated further.

Use of the Dominguez Channel

Joint use of the Dominguez Channel has been marginally studied in the past, principally in the area of recreational uses. The principal question that must be considered, then, is whether recreation and/or commercial uses can be incorporated into a workable scheme.

The commercial aspect appears to be more feasible for the first stage of the development, in view of the following factors.

The location of the proposed Classification Yard almost at the mouth of the Dominguez Channel presents a viable transportation link between the sea-going carriers and the national railroad and trucking systems. Clearance requirements for tugs are 20 feet from waterline to tip of radio antenna, requiring the reconstruction of at least three street and three railroad bridges. The latter would have to be reconstructed in any case with the railroad improvements necessary for the area.

The Port of Los Angeles is planning the establishment of a barge lumber yard on the northerly side of the Consolidated Slip. In order to accomplish this effectively, the existing recreation marinas in the vicinity would have to be eliminated. This, in combination with the development of the Classification Yard, could be an economical scheme, providing a suitable waterborne (barge) service to this location.

Development of other areas similar to the Cabrillo Marina (by the Port of Los Angeles) presents a possibility for relocation of recreational facilities away from the strictly commercial operations of the Port of Los Angeles. Although this is believed to be sound policy, it is recognized as a somewhat emotional issue. Therefore a tradeoff of inner harbor channels for the extreme southeast portion of the outer harbor would appear to present distinct advantages on both sides.

First-stage development, up to and including the Classification Yard area, could be accomplished without serious consequence as far as the flood-control program is concerned. Any modification of the channel cross-section would have to account for the existing Dominguez Gap salt-water intrusion barrier. The existing channel has a five-foot clay lining with stone revetment and filter blanket along the sides to prevent contamination of the groundwater reservoir.

Development

Although the utilization of the existing flood-control channels is not an essential item in the overall transportation system, it does present

an efficient and relatively economical system that could relieve the other modes of transportation. Expansion of port facilities can be accomplished quite easily by utilization of an existing network of right-of-way corridors that could release valuable port property for other uses. The waterways section of this report deals with craft which could conveniently use flood-control channels, whether they contain water or not. Air-cushion vehicles appear to be especially applicable.

Since the objective of the existing channels is for protection against flooding, any joint use of these facilities necessarily would have to retain this use as its principal concern. Additionally, it must be recognized that, for this same reason, certain periods of nonavailability are inevitable to certain uses. However, the disadvantages to be found, i.e., high costs and extensive liaison and agreement activities, can be effectively dealt with in enhancing the port expansion concept.

At the present time, flood-control channels in Southern California represent virtually unused rights-of-way. They are already paid for and are available, and they serve little other than their primary use. In fact, they act as a receptacle for garbage and a playground for children (which is very unsafe). Therefore, in view of the high cost and lack of funds for construction of transportation "guideway" facilities, it is recommended that these valuable but dormant potential transportation arterials be developed.

Development for the upper reaches of both the Dominguez Channel and the Los Angeles River can be accomplished by a staged development scheme. As in the case cited beforehand, both right-of-way widths and vertical bridge clearances present costly problems that would have to be overcome. Additionally, tidal action, i.e., year-round water flow, reaches only as far upstream as Vermont Avenue in the Dominguez Channel, consequently requiring extensive modifications for continued use of water traffic upstream of the Classification Yard.

In the event that the operation of air-cushion vehicles (for cargo or passengers) is to be developed using flood-control channels, certain other modifications would be needed. These include, for example, ramps for diversion past low bridges and stations, a lowering of the channel in some places, and protection from intruders.

As to operations, it is recommended that vehicles and vessels be judiciously segregated. While some mixes (such as ACV's and barge traffic) are acceptable, it is desirable to avoid dual use for commercial and private (recreational) purposes. Furthermore, in respect to shipping, it would not be prudent to plan for deep-water ships (due to the excessive, probably unjustified costs of deepening the channels), and operating them simultaneously with barge transportation.

Role of the Corps of Engineers

The role of the Corps of Engineers was discussed at the various meetings connected with the Los Angeles River utilization and development. It was believed then that the Corps' role, from a flood-control standpoint, would be to determine the feasibility of the proposed transportation corridor by looking at any hydraulic limitations and reviewing policy regarding operation of the flood-control channel system to determine if transportation is compatible with this policy. If a proposal were then deemed feasible, the Corps would provide assistance in the design of structures to ensure the integrity of the channels.

The Corps' role was expected to be essentially an advisory one, and is thus relatively low key. The concerned agencies would work in partnership, providing information when needed and handling the actual transportation planning.

If and when a detailed analysis of the impact of a channel transportation corridor on the hydraulics of the Los Angeles River system is made, considerations to be addressed must include:

- whether the channel can withstand heavy traffic
- how often during the year can the channels be available for transportation use
- problems in containing or routing low flows
- whether transportation use will have any impact on the hydraulic capacity of the channel.

AVIATION

Within the area encompassed by the Ports of Los Angeles and Long Beach and the U.S. Naval Facilities, there are six regularly used helicopter landing areas, a seaplane base (Catalina Terminal), and a former U.S. Naval Airfield, inactive since 1946 (Reeves Field). These are described below and are illustrated on Figure 27.

- Catalina Terminal. Aviation facilities at the Catalina Terminal consist of a seaplane base and a helipad. Catalina Airlines presently operates nine flights a day from the Catalina Terminal to Catalina Island. The terminal is located off the main channel directly under the west end of the Vincent Thomas Bridge. The airline operates two helicopters and two seaplanes from the Catalina Terminal. About 75,000 air passengers a year are transported through the facility.

- Ports O' Call Helipad. Helicopters land on a floating helipad adjacent to the Ports O' Call area. Flights are available to tourists on a nonscheduled basis for viewing the San Pedro harbor.
- U.S. Coast Guard Helipad at Reservation Point. The helipad at Reservation Point is actively used for Coast Guard patrol and rescue activities.
- U.S. Navy Helipad. The U.S. Navy operates a helipad at the eastern end of the Navy mole. This facility is used for storage of helicopters normally based on naval ships during the maintenance of shipboard helipads. It is also occasionally used for transporting personnel to and from the Naval Facilities.
- Queen Mary Helipad. A commercial helipad is located adjacent to the Queen Mary. Short sightseeing flights are conducted from here on a nonscheduled basis.
- Reeves Field Helicopter Landing Area. The Port of Los Angeles utilizes the northwest corner of Reeves Field, adjacent to the federal building, as a helicopter landing area. There are no markings on the site, but regular helicopter operations are conducted from an asphalt surface.

In addition to the active landing areas, Reeves Field, located just west of the U.S. Naval Facilities, is an unused former naval airfield. The field originally consisted of three asphalt runways (the longest being approximately 5,000 feet), two seaplane ramps, large asphalt apron areas, and several large aircraft hangars. Paved areas consist of five inches of asphalt on a five-inch sand base. Although there are many cracks and weeds in the pavement, it is believed that the airfield could be put back into operation for general aviation use by removing weeds and sealing with approximately 1/4-inch slurry seal. Although the hangars appear to be structurally sound, they would require some refurbishing. The Port of Los Angeles plans to demolish the two seaplane ramps shortly because of their poor condition.

In the past, the Navy has used a marked helipad on Navy Pier E, at the east end of Terminal Island. The Navy reports that this helipad is currently being phased out and is no longer being actively used.

Current Port of Los Angeles plans are to relocate the Catalina Airlines Helipad about 100 to 200 yards west when the Princess Louise is relocated to the Catalina Airlines area. The airline plans to add five more seaplanes to its current fleet, bringing the total number of seaplanes to seven.

The Port of Los Angeles plan for the Reeves Field area is for bulk storage. Several large sludge drying beds are currently being constructed along Seaside Avenue adjacent to the federal building on the former Reeves Field property. Sludge from the sewage treatment plant on the other side of Ferry Street will be dried here. Continuing further east on Seaside Avenue, the Least Turn nesting area (the northeast corner of Reeves Field) has been fenced. The plans for the disposition of the aircraft hangars and old unused military housing buildings at the south end of Reeves Field are unknown.

Reactivation of Reeves Field

The use of Reeves Field as a civilian airport is being proposed by many members of the aviation community. As other airports in the Los Angeles basin have reached capacity, additional aviation capacity is greatly needed. The reactivation of Reeves Field is seen by many as one solution to the problem.

The Southern California Association of Governments (SCAG) in its regional transportation plan suggests looking at unused airport facilities in the region. Reeves Field is mentioned several times in the plan as a possible general aviation airport.

The FAA's National Airport System Plan (NASP) identifies a new airport in the San Pedro area. The airport would be a general aviation airport basing approximately 200 aircraft in the next 15 years. Reeves Field is not specifically identified in the FAA report. Inclusion in the NASP, however, means that a new airport in the San Pedro area would be eligible for federal funding for construction of up to approximately 80% of total cost (as of October 1, 1978).

The County of Los Angeles, City of Los Angeles and State of California have also studied the possible reactivation of Reeves Field. Based on preliminary estimates, a runway of approximately 2,700 feet with adequate clear zones on either side could be easily accommodated at the site, using the former alinement of the main runway at Reeves Field. Two hundred aircraft could easily be based at the site. The airport would serve land planes, sea planes, and helicopters.

A runway alinement to be considered is approximately 20 degrees toward north/south from the former main runway alignment. The runway could then be extended further south to reach approximately 4,000 feet in length. Many of the housing units at the south end of Reeves Field would have to be removed.

Several advantages of the use of Reeves Field for aviation have been identified:

- The new airport would relieve the general aviation congestion at other Los Angeles area airports such as Torrance, Orange County, and Long Beach.

- The airport would serve businesses located at Los Angeles and Long Beach Harbors.*
- The Catalina Airline terminal would be relocated, which would lessen the conflict between sea-plane operations and shipping in the main channel.

There are, however, some disadvantages to the reactivation of Reeves Field; they are:

- It would take away land areas which could be valuable to the Port of Los Angeles for other uses such as bulk storage and possible future transportation corridors.
- It may inhibit the maximum use of Terminal Island landfill.
- In order to put the field back into operation, substantial costs would be required in rebuilding paved areas, providing airfield lighting, refurbishing hangars, providing tiedowns and T-hangars, and providing a passenger terminal.
- It is anticipated that the revenue from airfield operations would not cover the annual operational and maintenance costs.

There are potential benefits of using Reeves Field for civil aviation, but this would adversely impact the development of the harbor for commerce. The Long Beach Naval Facilities also strongly opposes it because of interference with operations at the naval station.

Development of a New Airfield at another Location

The possibility of locating a new airfield on new landfill should also be evaluated in the overall transportation planning for the port area. Although a new airport would have tremendous advantages to commerce in the area, costs for developing it on new landfill might outweigh any benefits.

It is recommended that consideration be given to the development of a public heliport facility in the port area. The facility would consist of marked and lighted helipads and a small passenger terminal,

* A survey conducted by the Los Angeles County Aviation Commission on May 9, 1978, indicated that 111 businesses (all located at Los Angeles and Long Beach harbors) responded. One-third said the airport would be an asset to their company operations, and nearly half supported the proposal to reactivate the field for aviation use.

and it would be available for commercial, public, and governmental use. The result would be consolidation of helicopter activity within the port area at fewer landing sites, which would provide a greater margin for safety as helicopter activity increases in the future.

Relationship of Aviation Facility and Other Transportation Modes

Either Reeves Field or any new aviation facility in the port would require adequate access and public parking. Access to Reeves Field could be by way of Ferry Street or Seaside Avenue on the east side of this field. In either case some modifications to the existing street system (such as widening, signalization, etc.) would have to be made, but these could be undertaken as part of the roadnet reorganization proposed for this area.

Ground access to the Catalina Terminal appears to be adequate to serve air passengers. Minor improvements such as signing are recommended.

Sea-plane activity in the main channel apparently has been compatible with shipping. However, as sea plane and shipping activities increase in the future, conflicts could arise.

ENERGY

All transport policies should reflect the following simple formula:

$$\frac{\text{Energy}}{\text{Transportation}} = \text{Evolution.}$$

Before making any policy, it is essential to understand and define transportation. Transportation is a service or facility by which persons or goods and property are conveyed from one location to another. Moreover, it is an industry created to satisfy the basic needs of society. Modern people, with their sophisticated and complex political and economic systems, require means of transportation (by road, water, rail, pipeline, air) that are regular, certain and efficient, for these create wealth, enhance living standards and contribute materially to the general welfare.

In today's complex world, any transportation system relying on an exhaustible source of energy is obviously going to grind to a halt sooner or later, causing chaos; yet this is just what is happening today--slow transportation suicide is on the horizon.

Transportation systems are mainly geared to oil. Several forecasts have been made of the world's possible oil production and they generally indicate that world oil will peak somewhere between the years

1985 and 2000 and decline thereafter. This means that transportation based on oil as a source of energy has little breathing space left. A simple solution to the problem is to use a different source of energy. This single conservative measure would allow dwindling oil stocks to be used by petrochemical industries and by some forms of transportation (such as air transportation) which will need time to convert to another form of energy. The source of energy chosen will have to be readily synthesized, and hydro- and nuclear-produced energy present themselves as alternatives.

In dealing with the San Pedro Ports transportation plan, conservation is of prime importance; energy conservation measures are basic to energy intensity and energy efficiency. In transportation, a knowledge of how much energy is being used by each mode and what percentage of it is finally converted into useful work is fundamental to the understanding of energy-use patterns and to the formulation of conservation strategies.

The total energy picture by mode (for the year 1974) is shown in Figure 28. Transportation relies on petroleum products for 96.9% of its energy needs (constituting almost 53% of the total United States petroleum consumption).

In terms of energy use, transportation is dominated by the passenger car, which uses 54% of all transportation energy and 69% of the highway energy. This means, in more absolute terms, that automobiles account for +13% of the total United States energy use. However, it should be pointed out that all general figures can be no more than approximations due to the wide variety of goods transported, services rendered, and individual route characteristics.

Improvement in energy intensity and efficiency have been observed in developing the transportation plan, including the possible application of some innovative methods of cargo handling and movement. These need to be pursued in order to develop optimal results relevant to energy conservation. Although questions of improvement in energy efficiency through technological and operational measures are of a speculative nature, it would appear that improvements on the order of 20% to 25% are attainable within 20 years.

Additionally, it is important to assess energy intensity and efficiency in considering further modal development and modal split. It has been shown by the United States Railway Association (1975) that the relationship between energy consumption ratios for intercity freight movement by truck and rail is about four to one. It has also been shown that railroads are the only surface transportation mode for which substitution of fuels for oil is technically feasible, since the source of electricity can be coal, nuclear power, water, etc. Although rail electrification is not anticipated in the San Pedro Ports area, some railroads are seriously considering trunkline electrification--a

factor which should not be ignored in the context of transportation in the year 2000.

COST ESTIMATES

Order-of-magnitude estimates of cost are presented on the following page in 1978 dollars to offer a level of investment that may be required to implement certain identifiable elements of the plan. These have been based on little more than concept. Additionally, there is a number of features that have not yet been developed, so no monetary figure can be allotted to them.

The figures exclude rights-of-way acquisition and clearance, building acquisition and/or removal, and relocation of existing facilities (e.g., utilities). No provision has been made for unacceptable soils conditions. (It is believed that a large amount of the ground may be unsuitable in its present state due primarily to oil depletion, and will require special provisions for foundations, etc.) No escalation allowance or provision for inflation has been added, nor have costs of engineering and construction management.

In the case of freeways and highways, costs of signalization and control have been included for intersections and duodirectional operations over bridges. Lighting has been included in all cases, as have on/off ramps.

Some points are worthy of note relevant to the actual estimated figures, as follows:

- A double-deck facility (six lanes on an overhead structure) appears to be the only way to increase the capacity of Pacific Coast Highway; this alone is estimated at \$44 million. This includes on/off ramps, lighting and refurbishing the existing surface roads.
- Badger Avenue Bridge, as described in Option 1, is estimated at \$5.5 million, which is included in estimate Item B (highways). This figure is based on a ±400-foot single steel span, capable of supporting two rail tracks plus four highway lanes, utilities and pipeway crossings. Incidentally, a tunnel (if it were feasible--which is doubtful) would cost approximately four times that figure.
- The Classification Yard includes the cost of the control tower, which (complete, but without off-site work and without furnishings and equipment) is estimated at ±\$2 million.
- There will be some credits in recovery of redundant or scrap railroad materials.

CAPITAL COST ESTIMATES
(ORDER OF MAGNITUDE)

A. Railroads

New classification yard	\$20,000,000
Revised track configuration throughout the area	10,000,000
Signaling/control/communications (yard + M/L + harbor lines)	<u>8,000,000</u>

TOTAL \$38,000,000

B. Highways

Freeways	\$18,300,000
Highways	<u>66,600,000</u>

TOTAL \$84,900,000

C. Other Modes

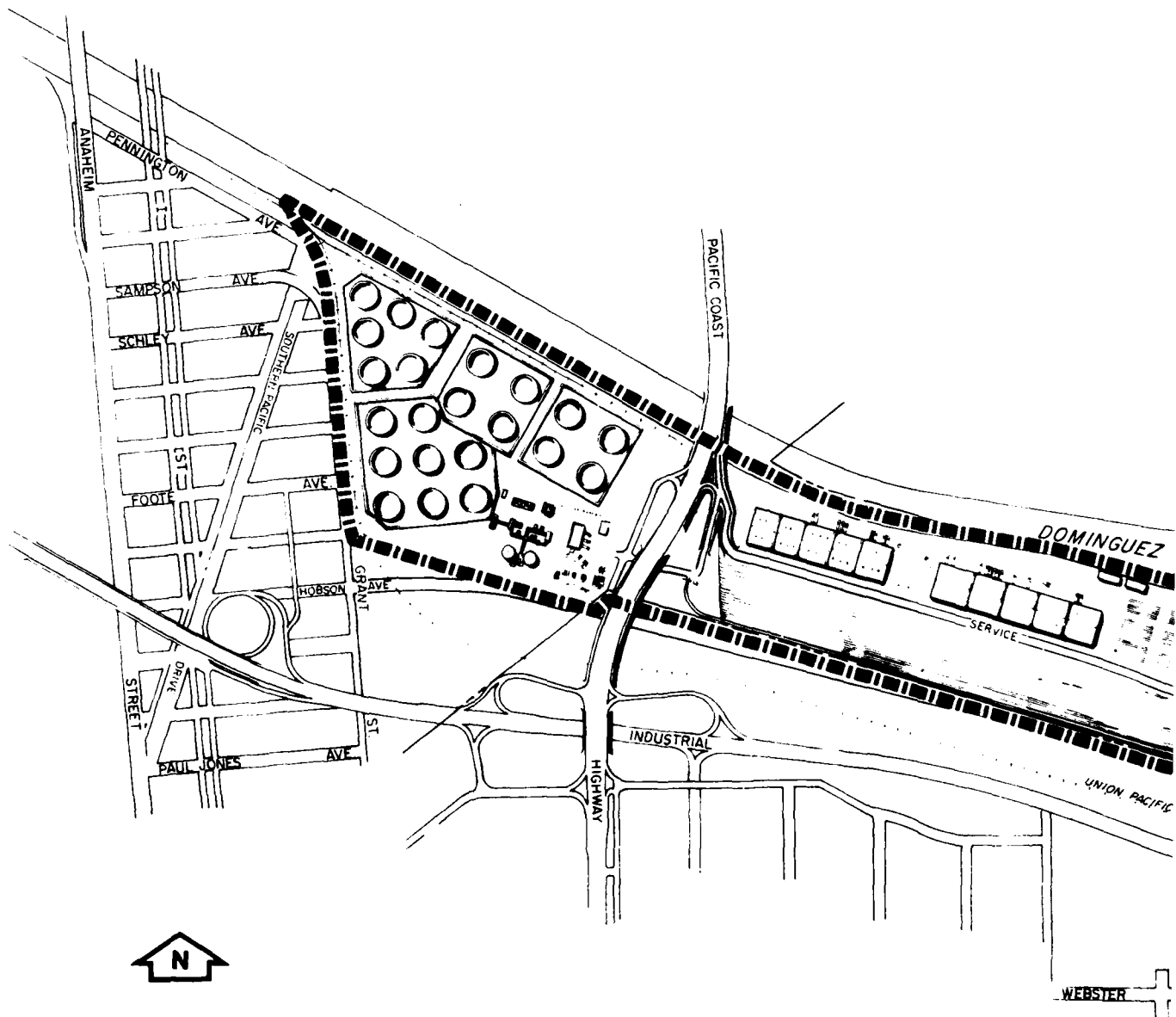
Proposals for the development of other modes, viz. transit, waterways, pipelines, flood-control channels and aviation (if developed at all) are not yet sufficiently advanced to enable cost estimates to be prepared. However, operating comparisons between various types of marine craft are given below:

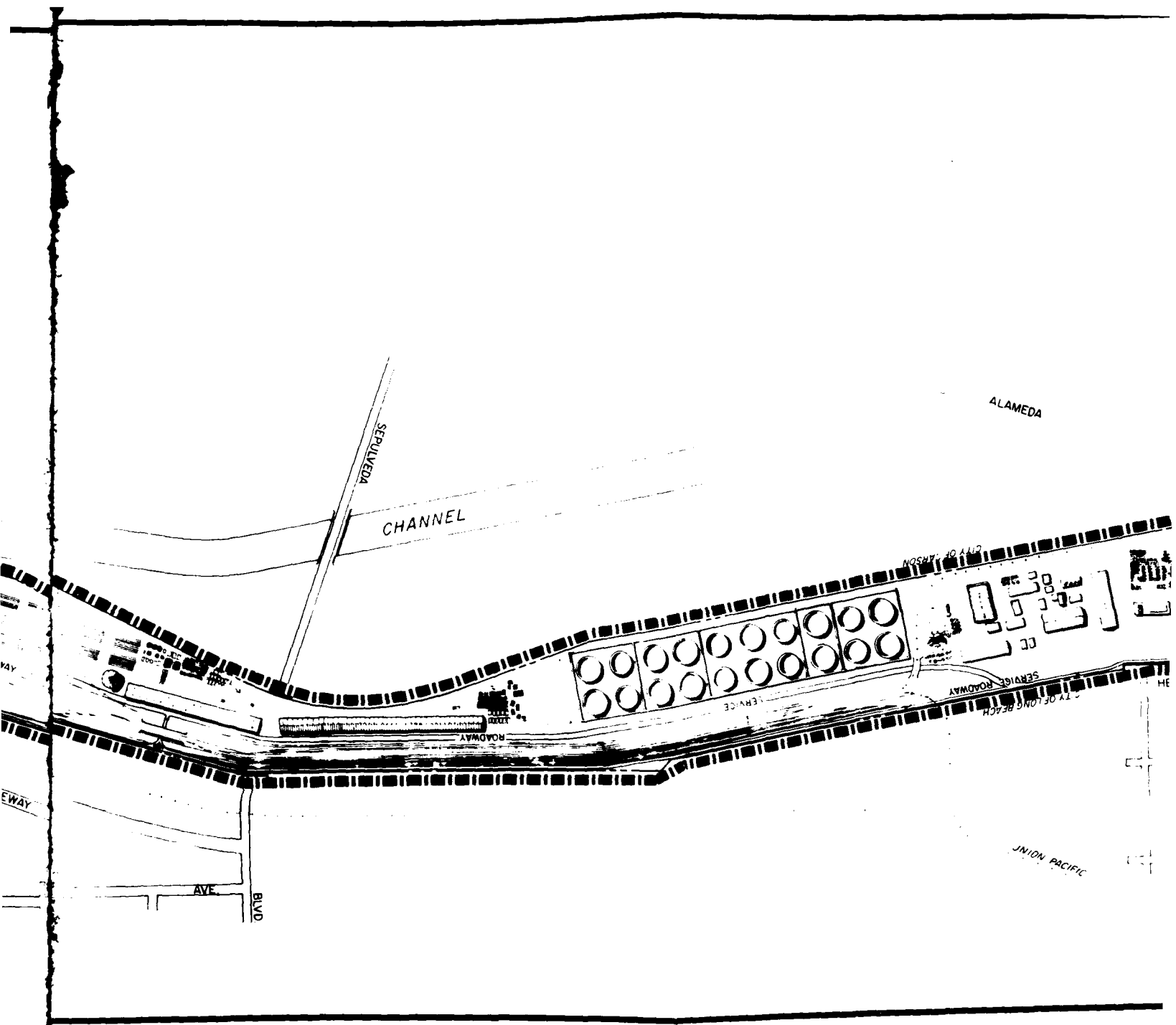
<u>Type</u>	<u>HP/Gross Ton Knot</u>	<u>Cost-%/Payload Ton Knot</u>
Advanced Planing Hull	1.2 to 1.5	1,800 to 2,000
Hydrofoil	1.25	8,000 to 10,000
ACV	1.3 to 2.0*	2,000 to 3,000
SES	0.8 to 1.0*	1,700 to 1,900

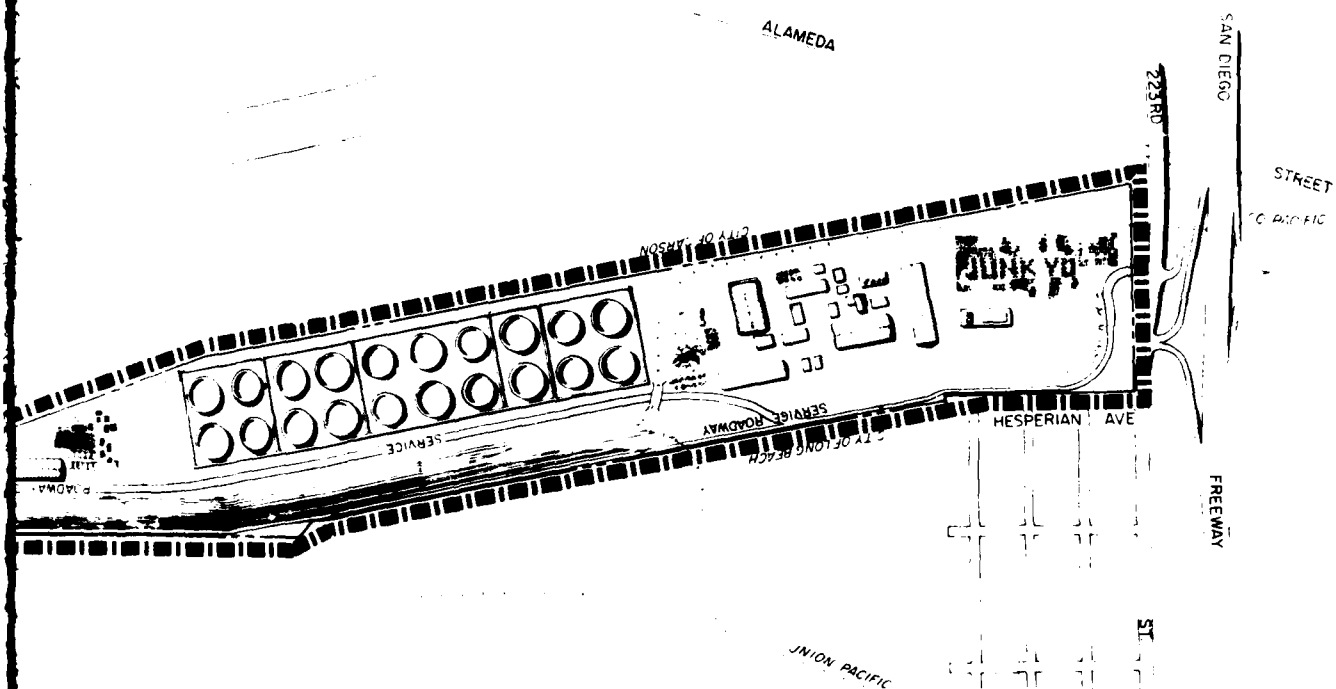
*includes cushion power

Note that estimates for the Combined Container Distribution Center, and its equipment and feeder systems, have not yet been developed.

* * * * *

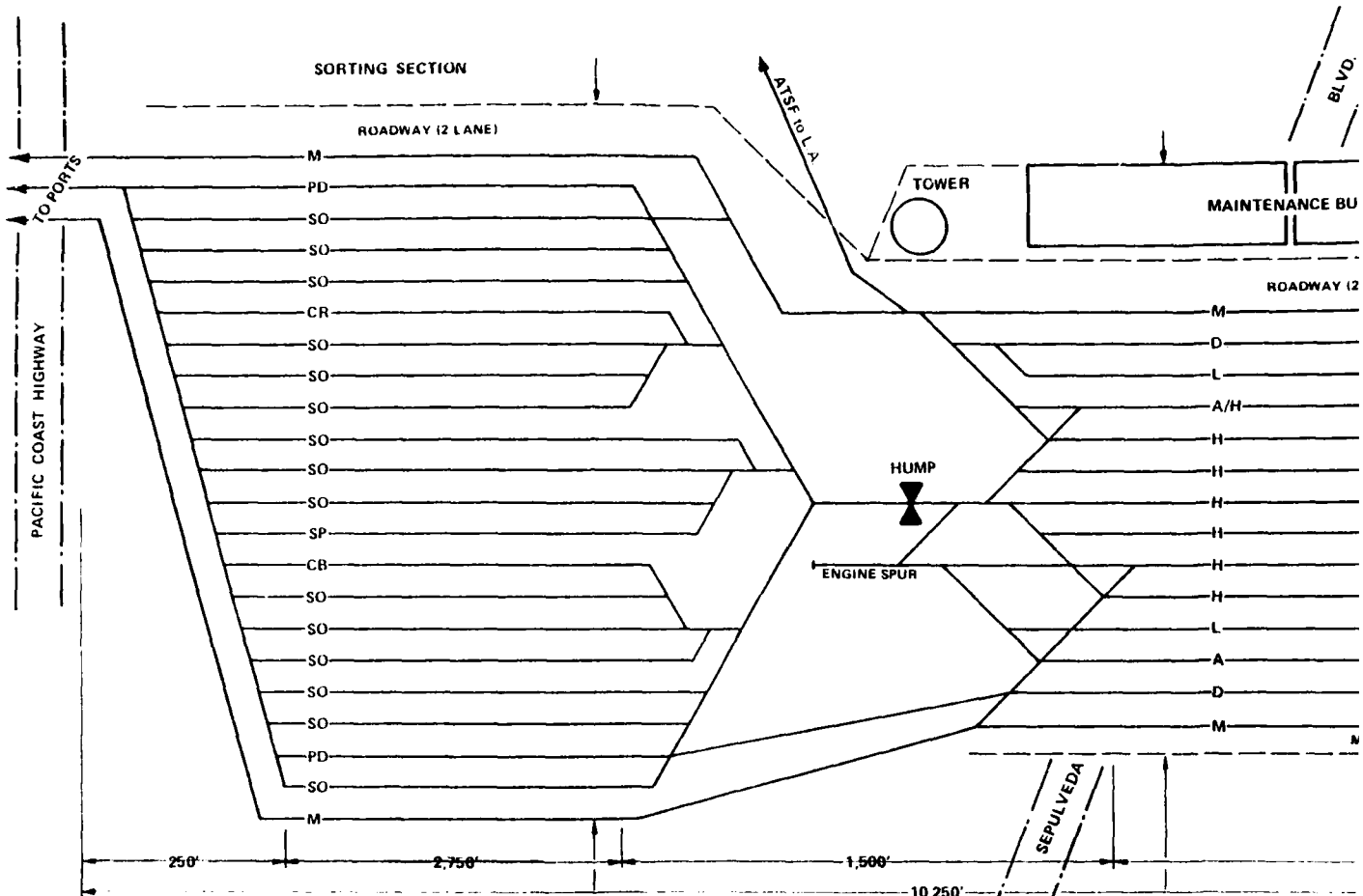






PROPOSED CLASSIFICATION YARD

FIGURE 5

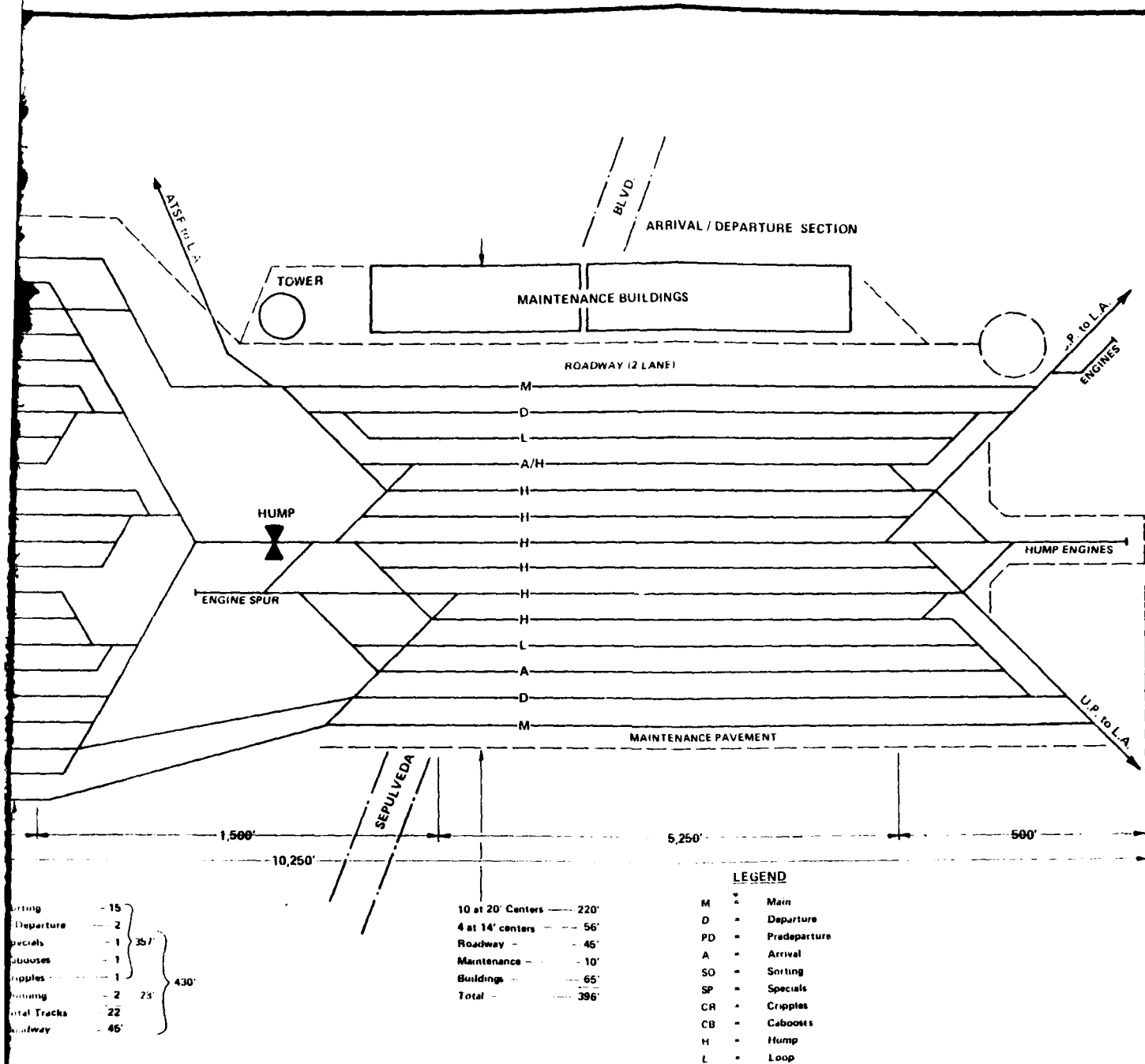


17' Centers	Sorting	15	357'
	P/Departure	2	
	Specials	1	
	Cabooses	1	
	Cripples	1	
14' Centers	Running	2	28'
	Total Tracks	22	
	Roadway	45'	
			430'

10 at 20' Centers	220'
4 at 14' centers	56'
Roadway	45'
Maintenance	10'
Buildings	65'
Total	396'

Notes.

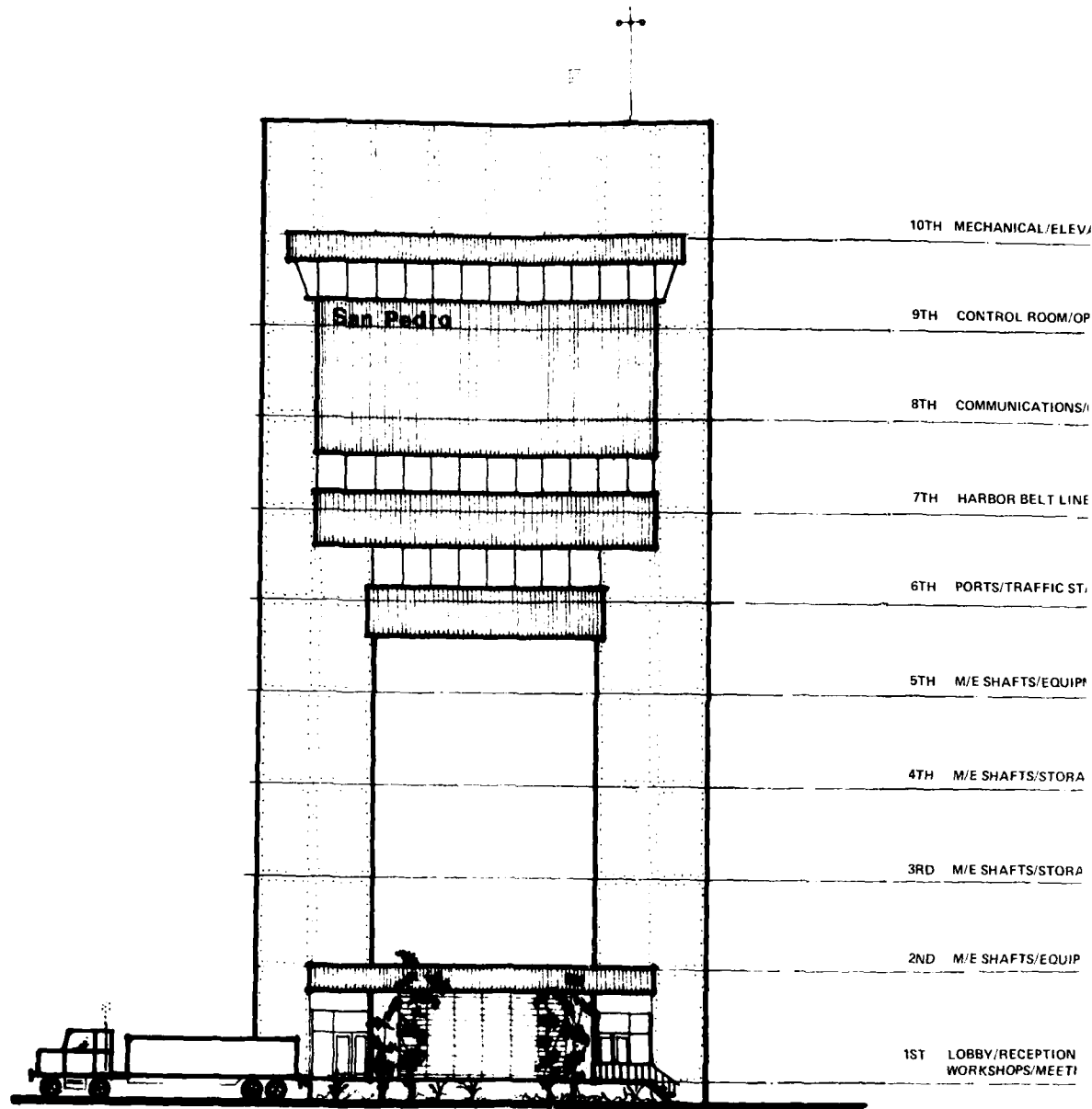
1. Yard to be fully automated.
2. All approaches to be centrally signalled.
3. Tower to contain yard control, area signaling, belt line offices, yard master, communications center, power supplies.



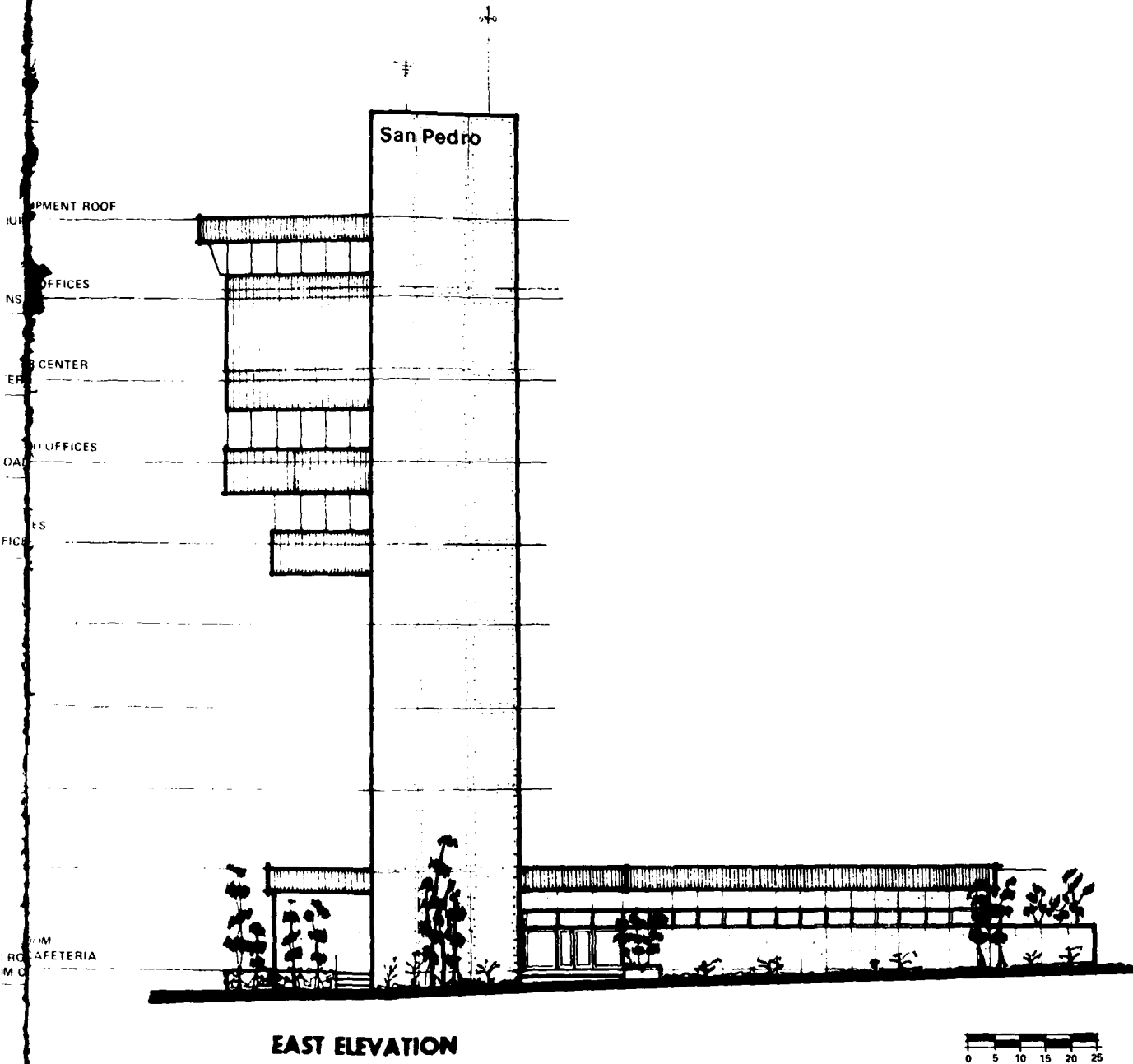
(not to scale)

SCHEMATIC CONFIGURATION

CLASSIFICATION YARD



NORTH ELEVATION

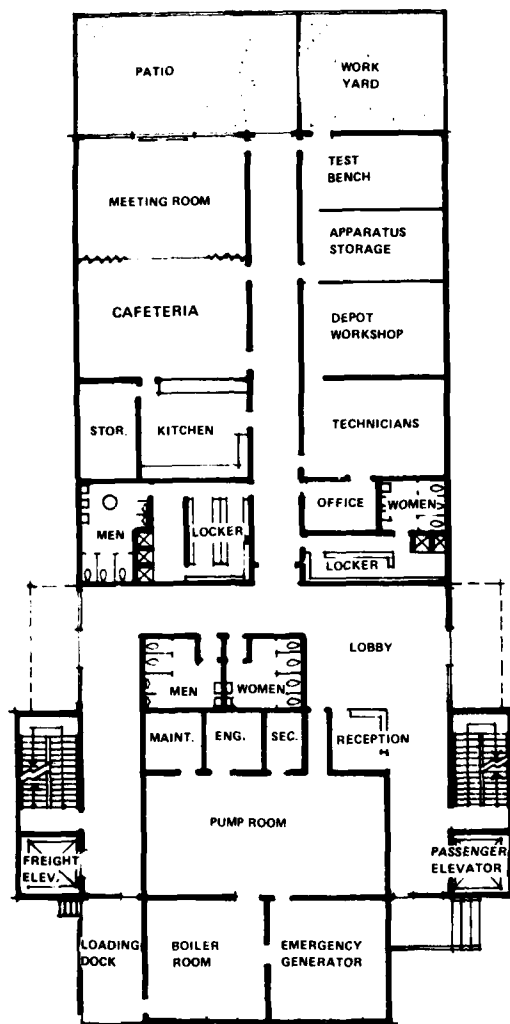


Transportation Study - San Pedro Ports

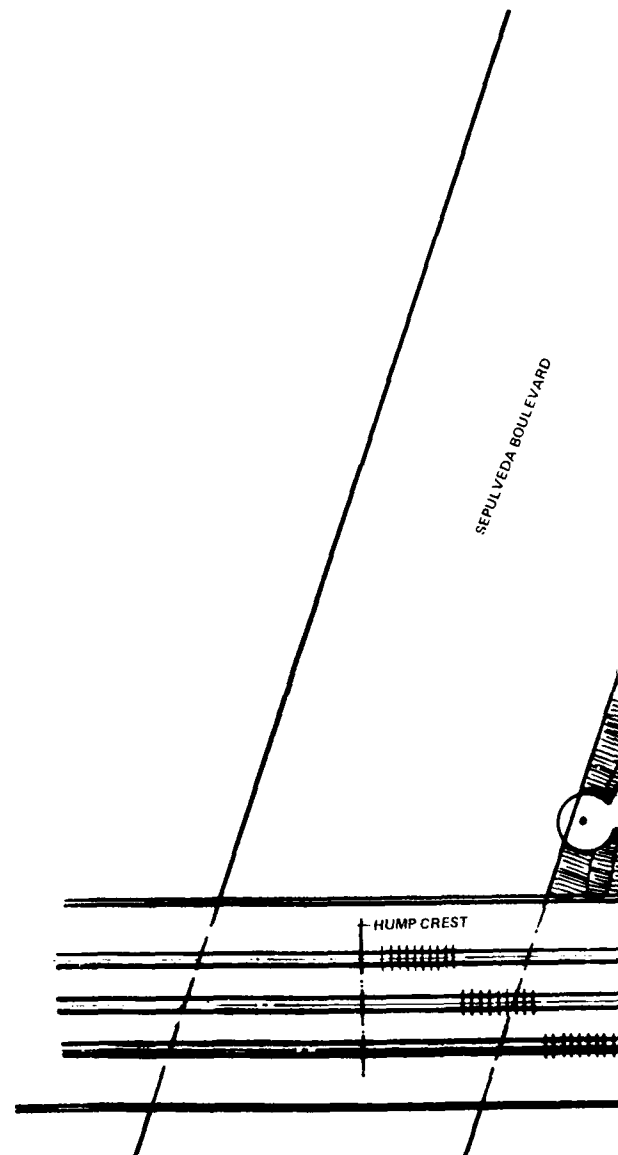
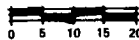
CONTROL TOWER ELEVATIONS

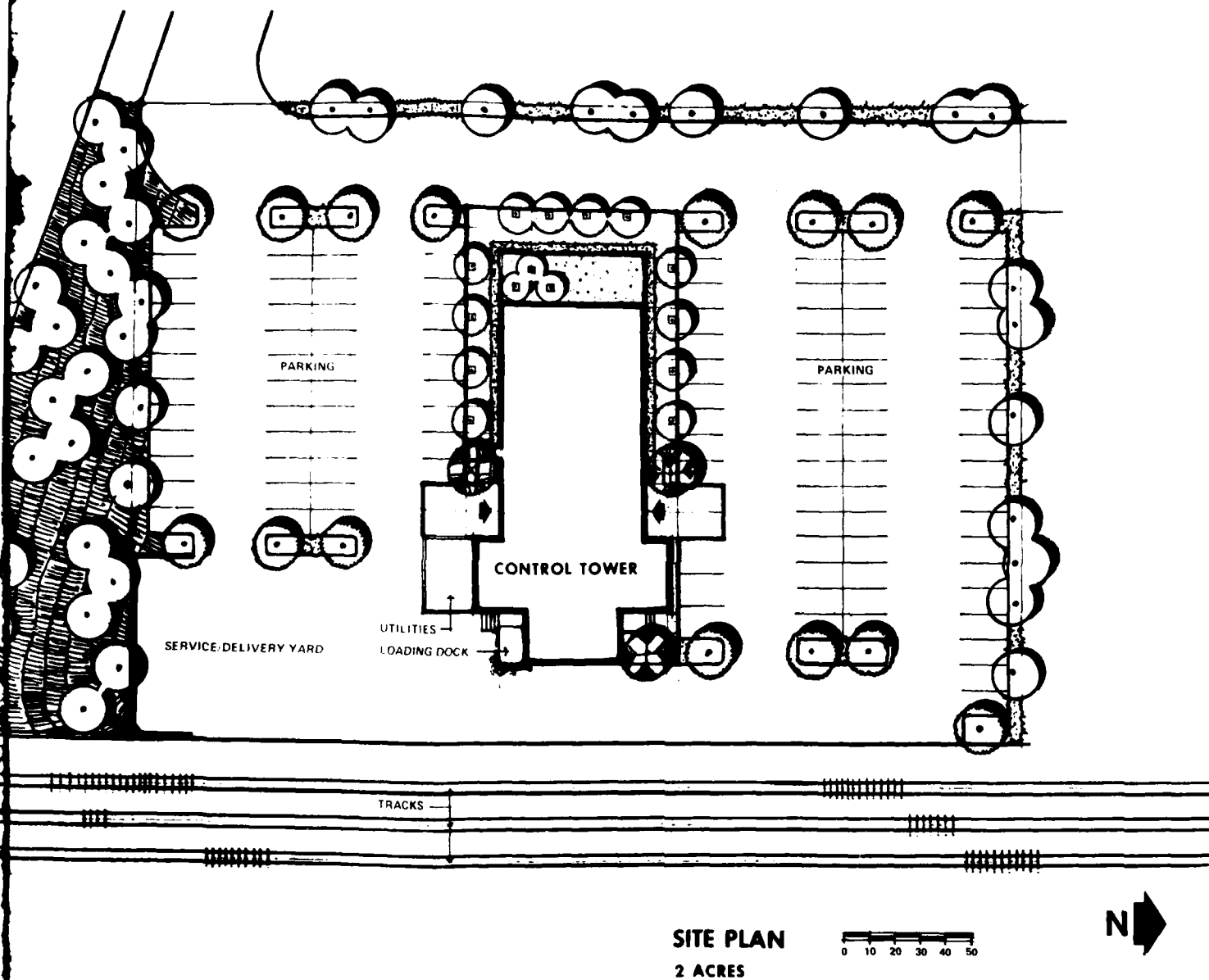
U.S. Army Engineer District Los Angeles Corps of Engineers

FIGURE 7a



FIRST FLOOR PLAN
8840 SQ. FT.

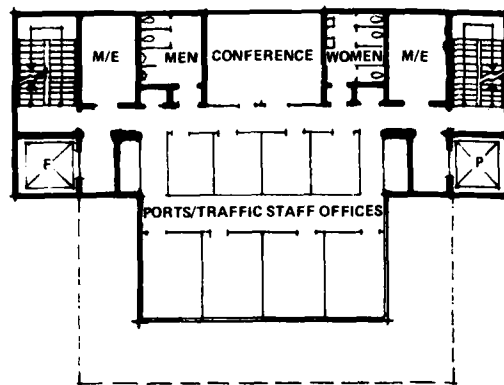




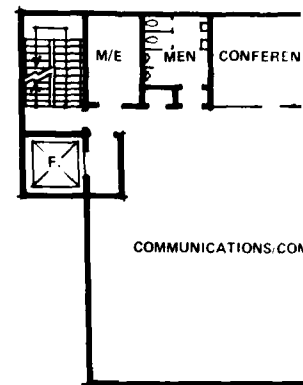
Transportation Study - San Pedro Ports
**CONTROL TOWER
 FLOOR & SITE PLAN**

U.S. Army Engineer District Los Angeles Corps of Engineers

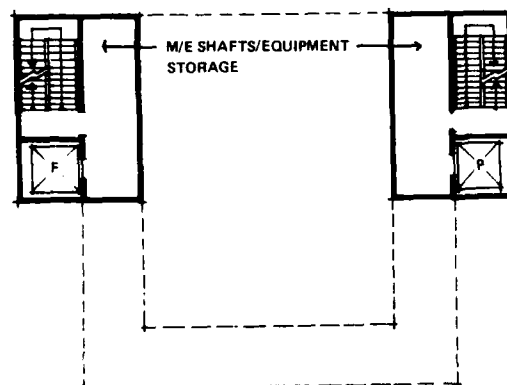
FIGURE 7b



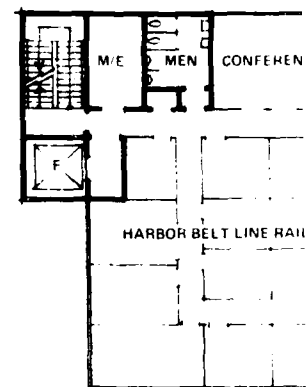
SIXTH FLOOR
3200 SQ. FT.



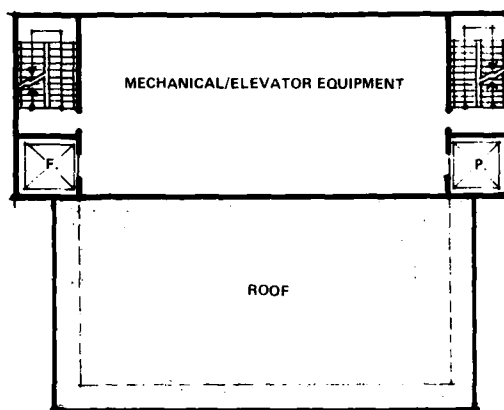
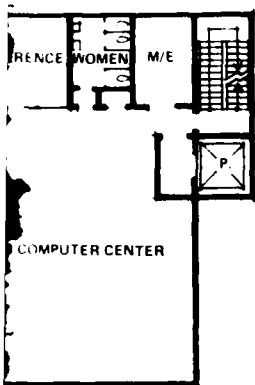
EIGHTH FLOOR
4200 SQ. FT.



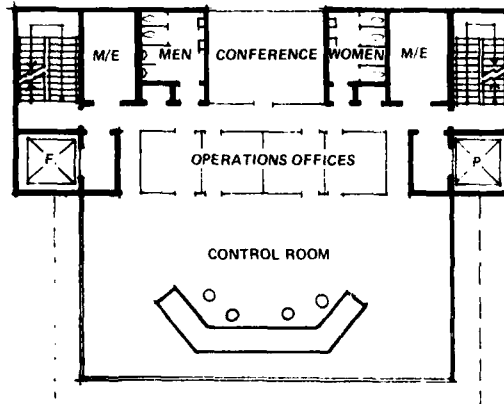
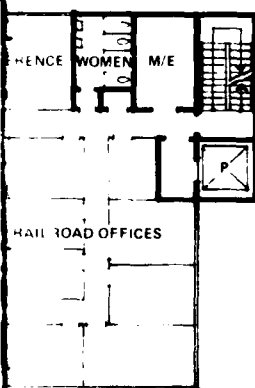
SECOND THRU FIFTH FLOORS
4800 SQ. FT.



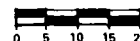
SEVENTH FLOOR
4200 SQ. FT.



TENTH FLOOR
2400 SQ. FT.



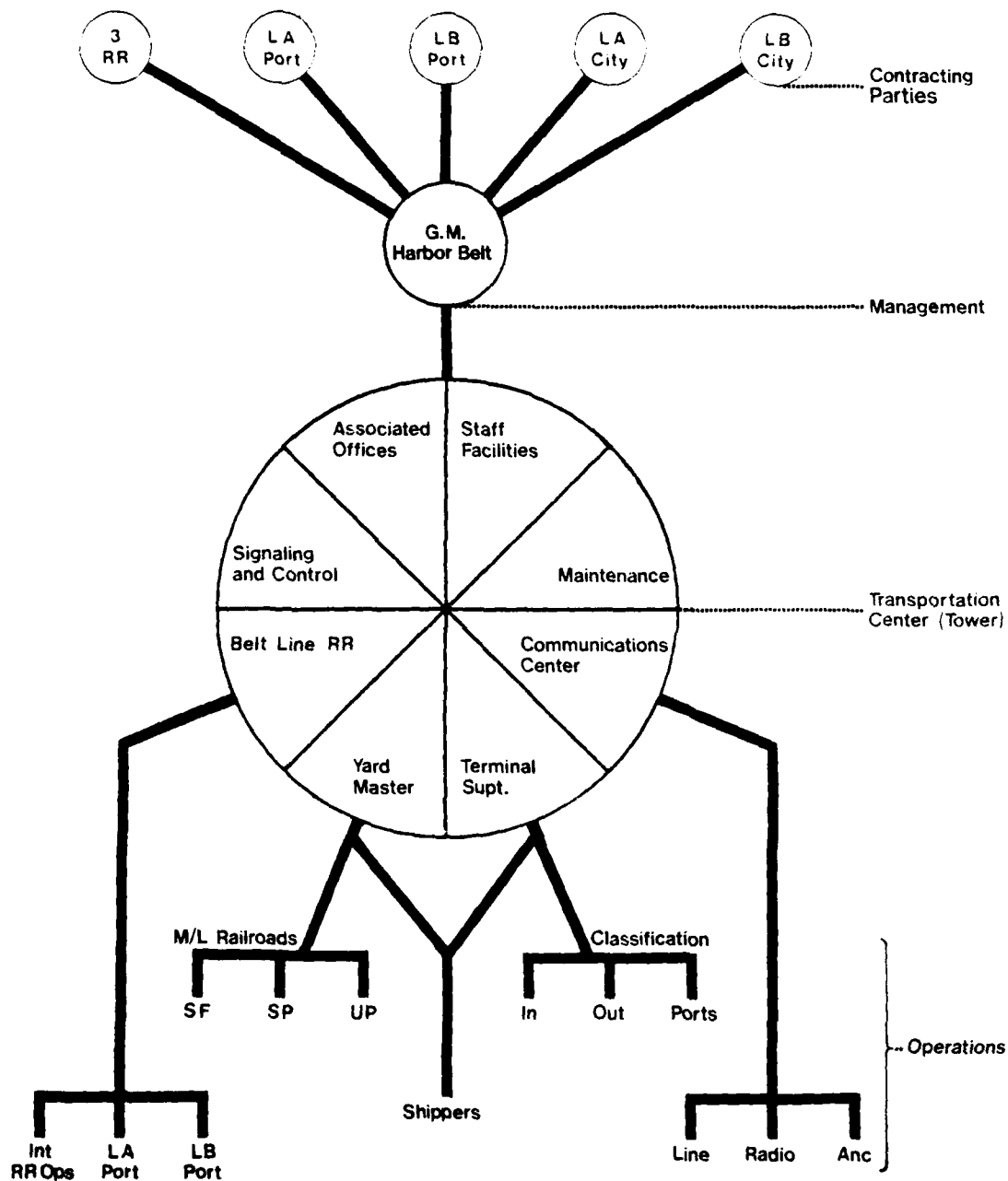
NINTH FLOOR
4200 SQ. FT.



Transportation Study - San Pedro Ports **CONTROL TOWER** **FLOOR PLANS**

U.S. Army Engineer District Los Angeles Corps of Engineers

FIGURE 7c

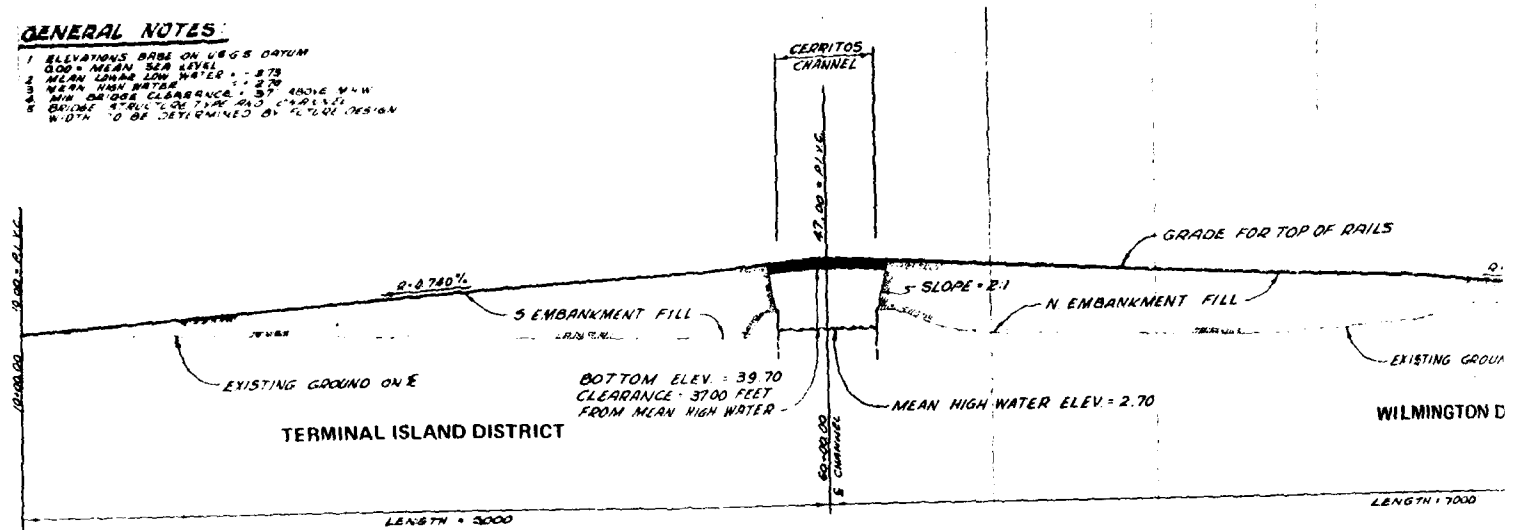


PROVISIONAL RAILROAD ORGANIZATION

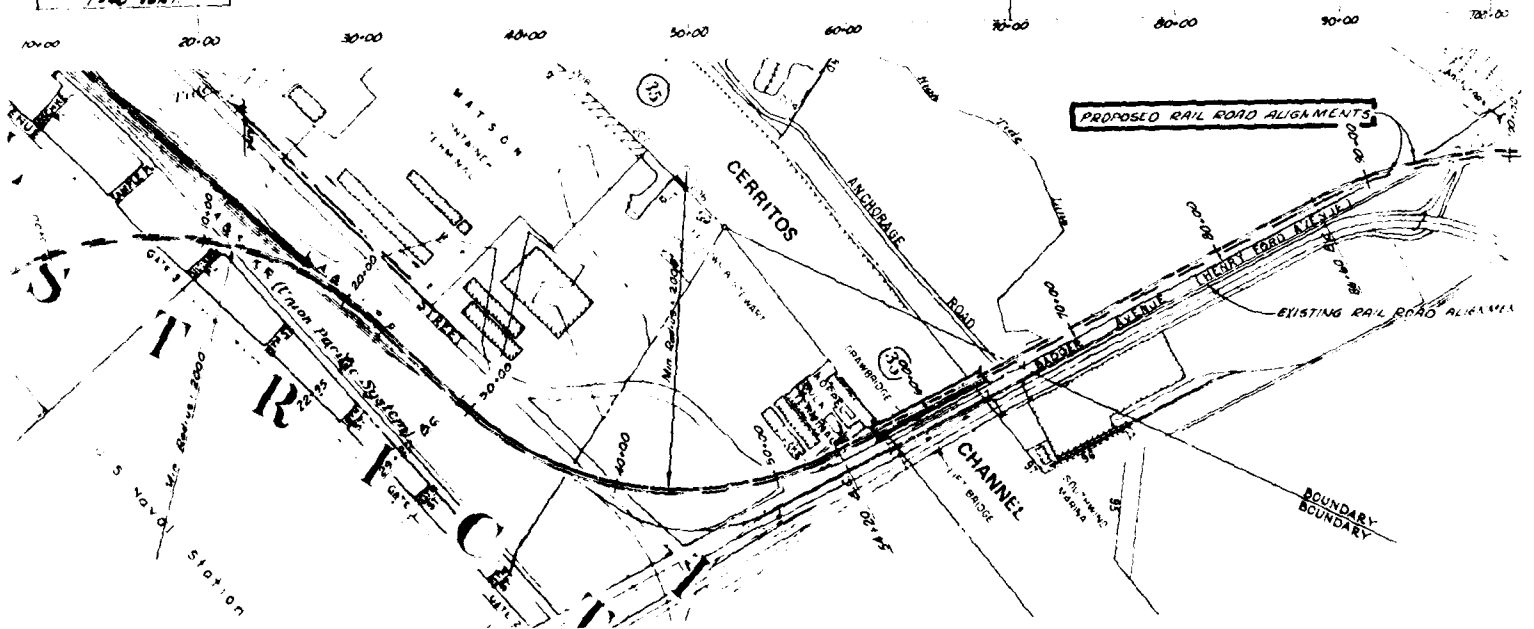
FIGURE 8

GENERAL NOTES:

- 1 ELEVATIONS BASE ON U.S.G.S DATUM
- 2 0.00 = MEAN SEA LEVEL
- 3 MEAN LOW WATER = - 5.75
- 4 MEAN HIGH WATER = - 2.70
- 5 MIN. BRIDGE CLEARANCE = 37' ABOVE M.H.W.
- 6 BRIDGE STRUCTURE TYPE AND CAPACITY
- 7 WIDTH TO BE DETERMINED BY LOCAL DESIGN



PROFILE SCALE:
1" = 400' HORIZ.
1" = 40' VERT.



OPTION

BADGER AVENUE BRIDGE

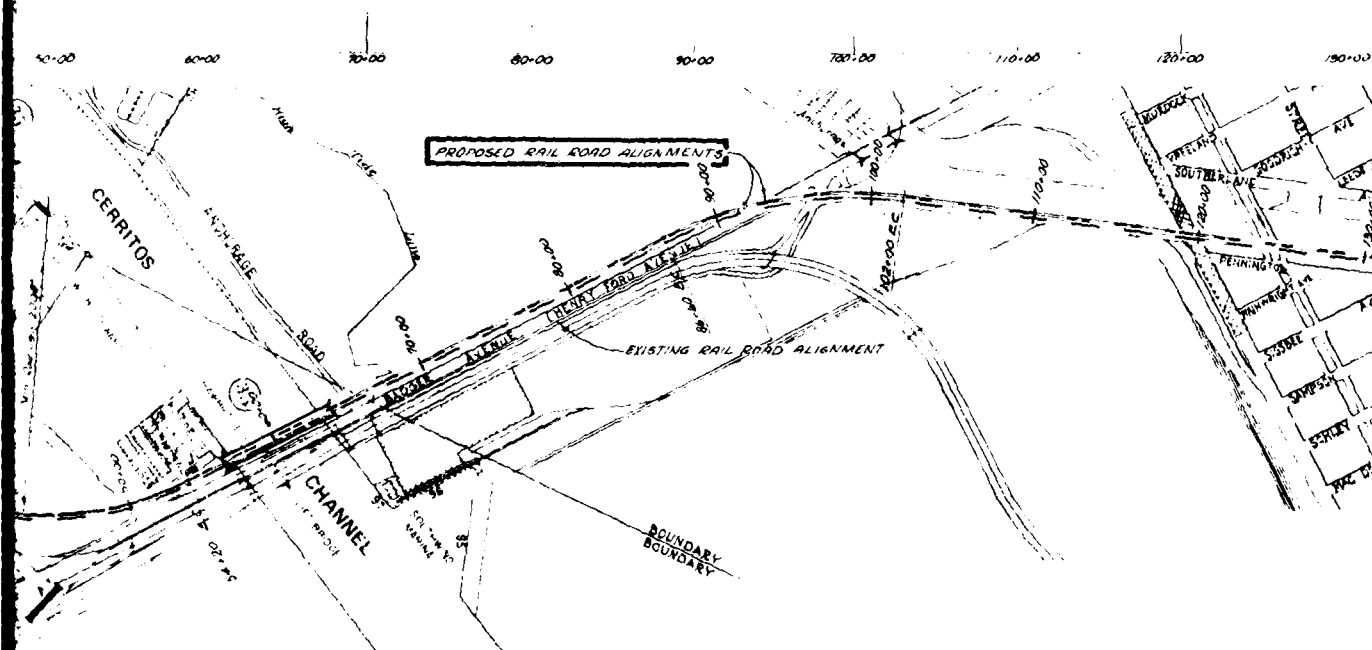
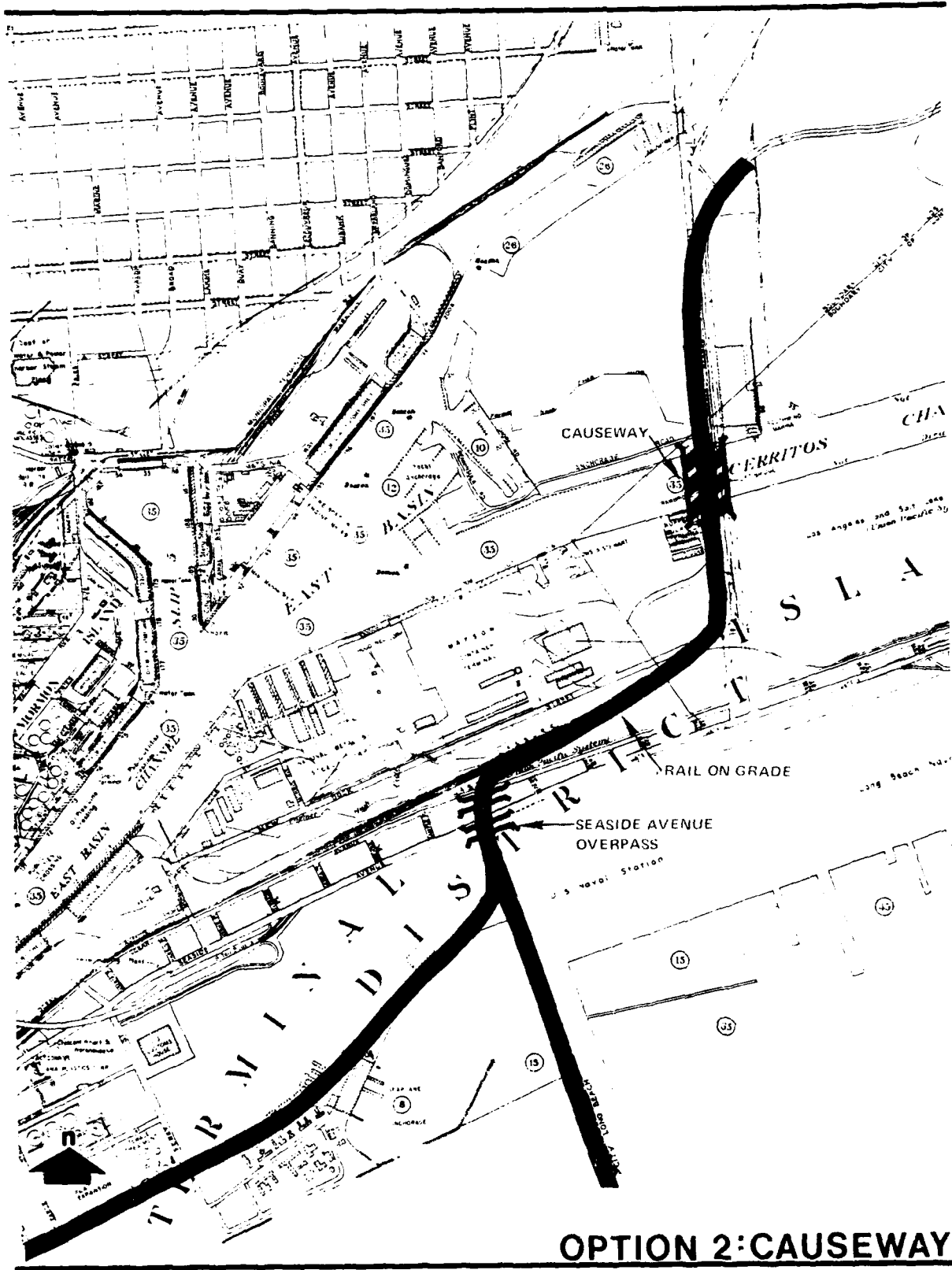
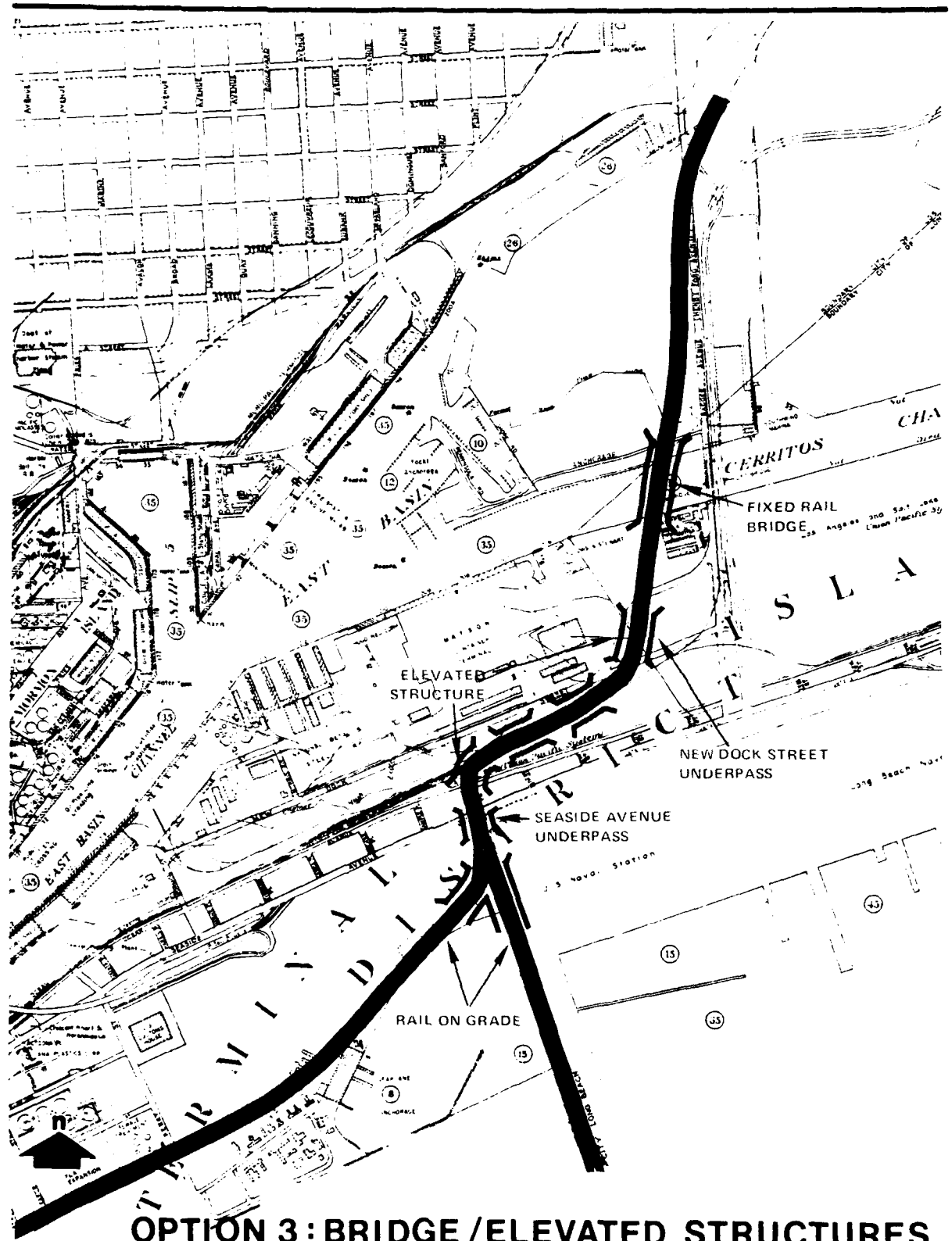


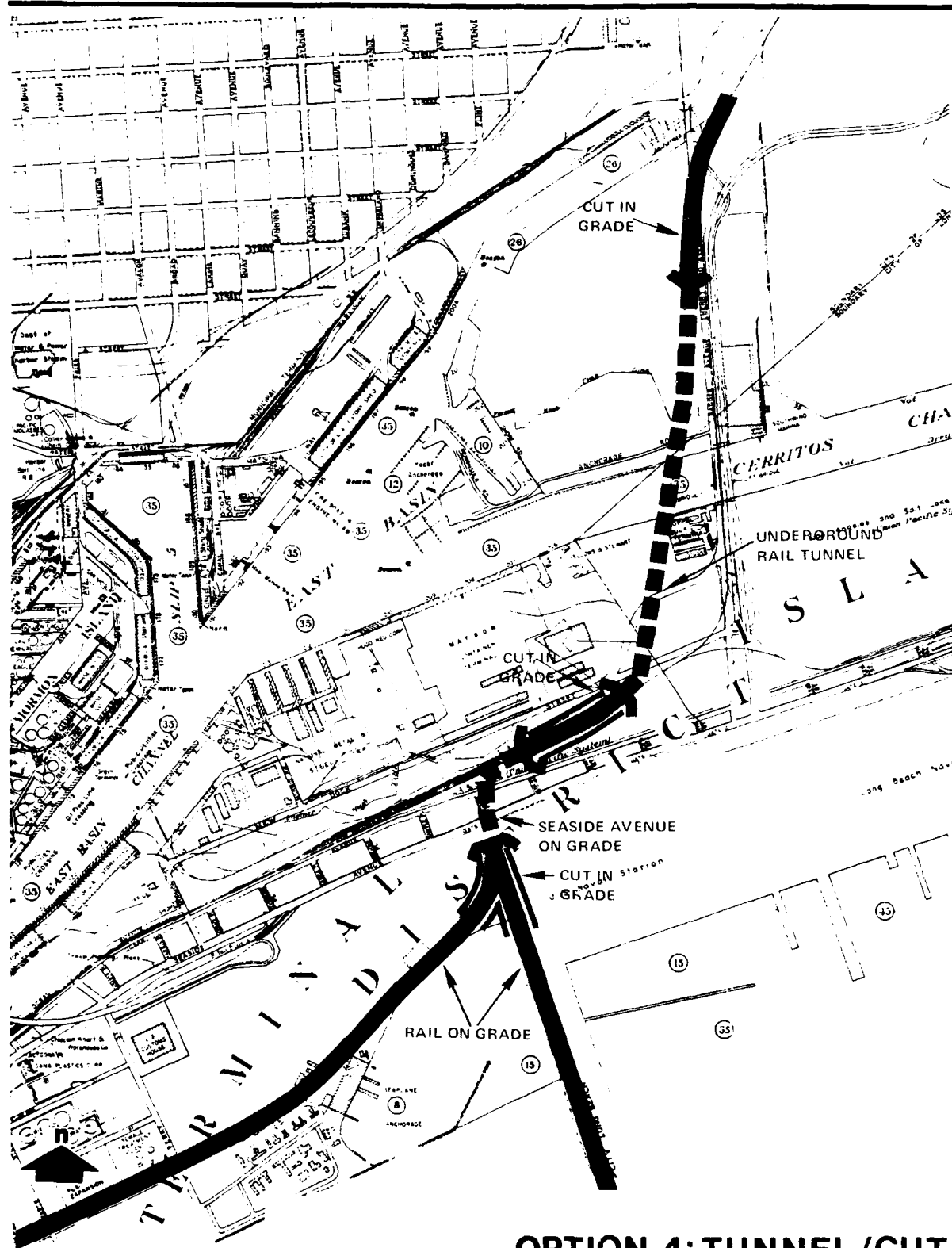
FIGURE 9



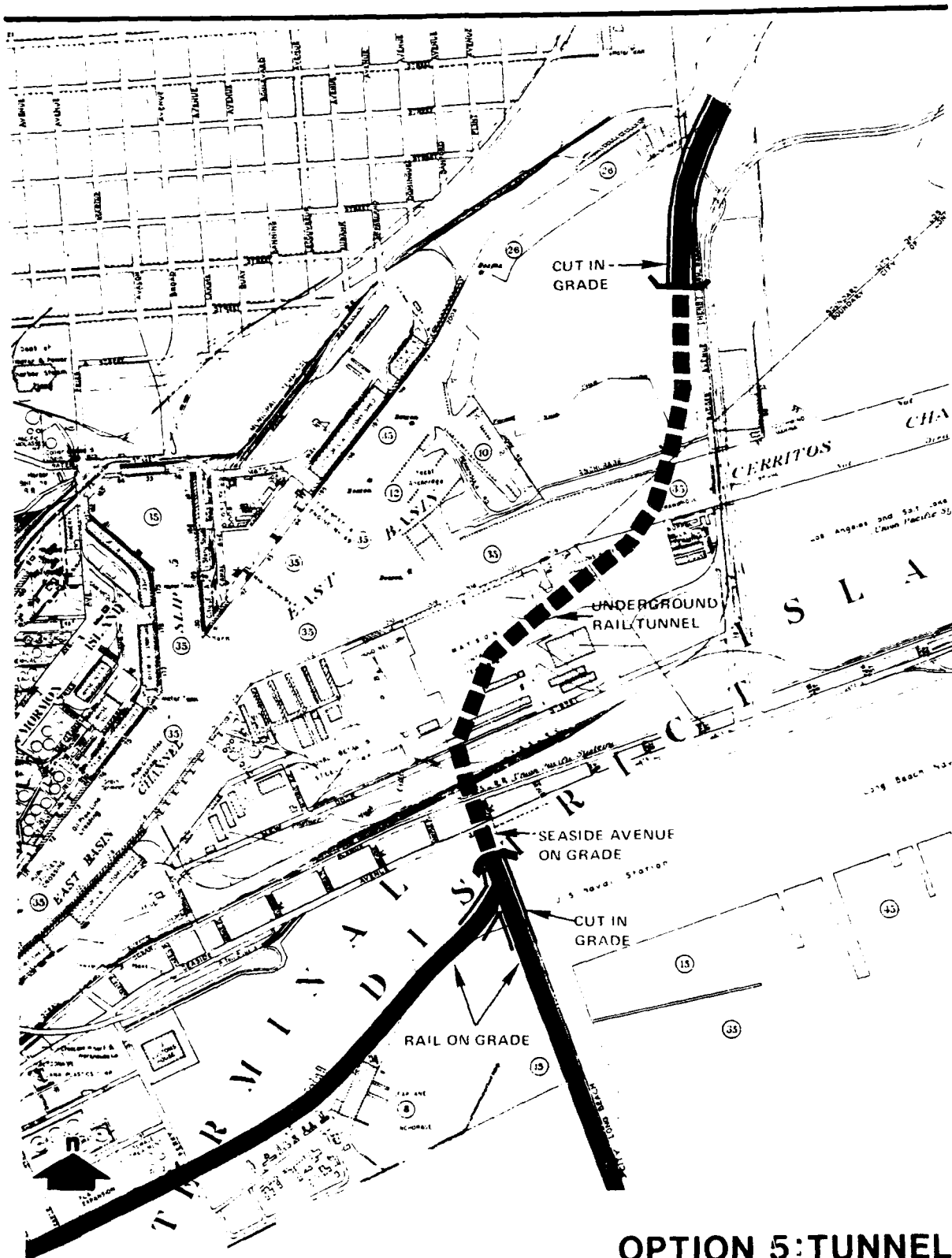
OPTION 2: CAUSEWAY
BADGER AVENUE BRIDGE



OPTION 3: BRIDGE/ELEVATED STRUCTURES
BADGER AVENUE BRIDGE

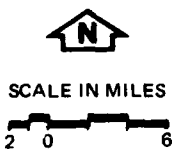


OPTION 4: TUNNEL/CUT
BADGER AVENUE BRIDGE

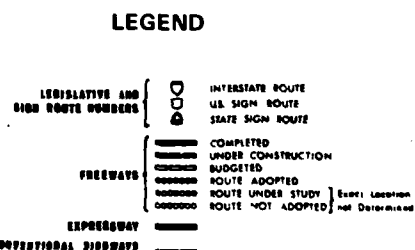


OPTION 5: TUNNEL **BADGER AVENUE BRIDGE**

FIGURE 13

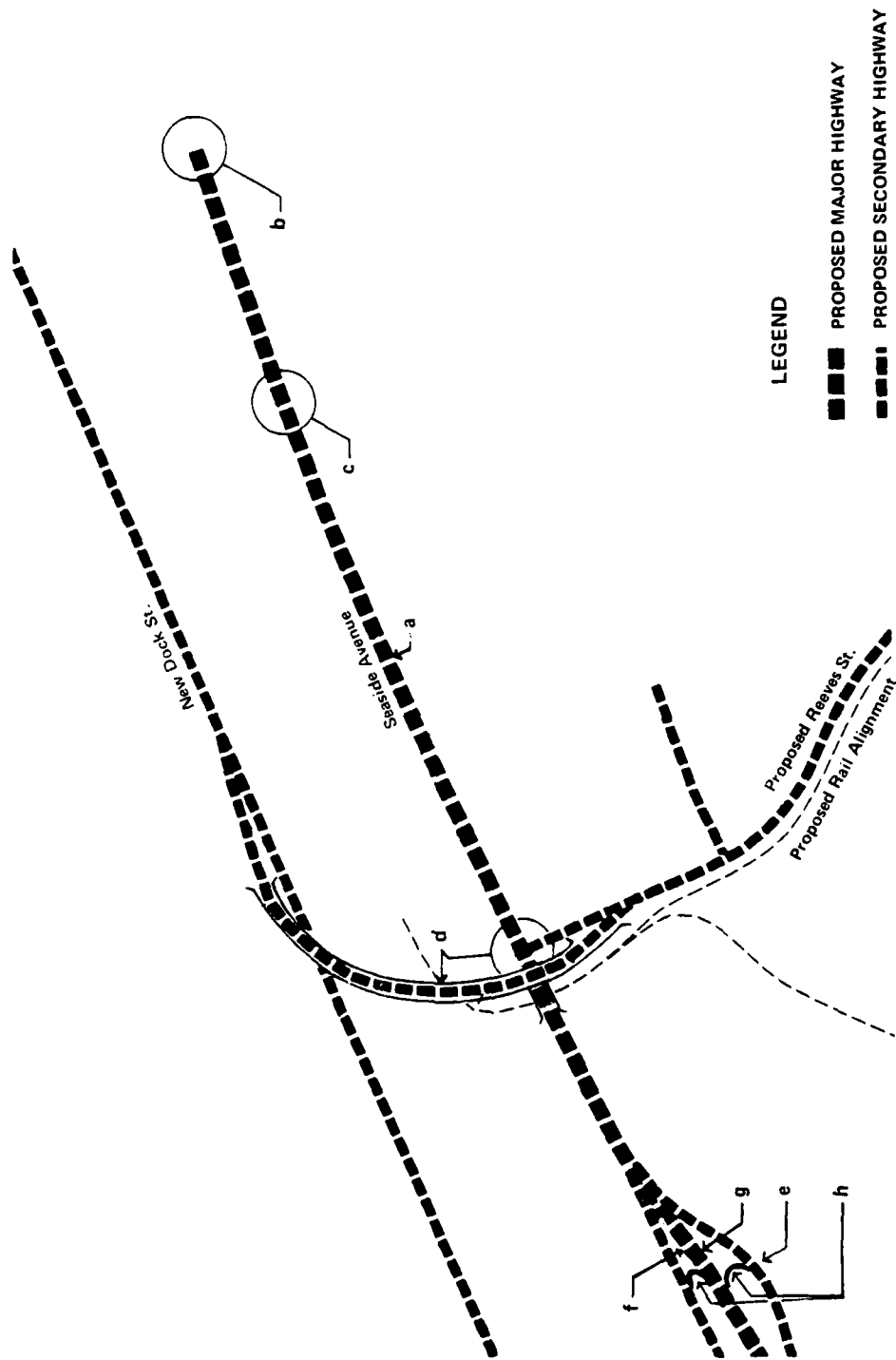


Source: state of California
Business & Transportation Agency
Dept. of Transportation
District 7; Oct. 1977.



STATE HIGHWAY SYSTEM- LOS ANGELES COUNTY

FIGURE 15



LEGEND

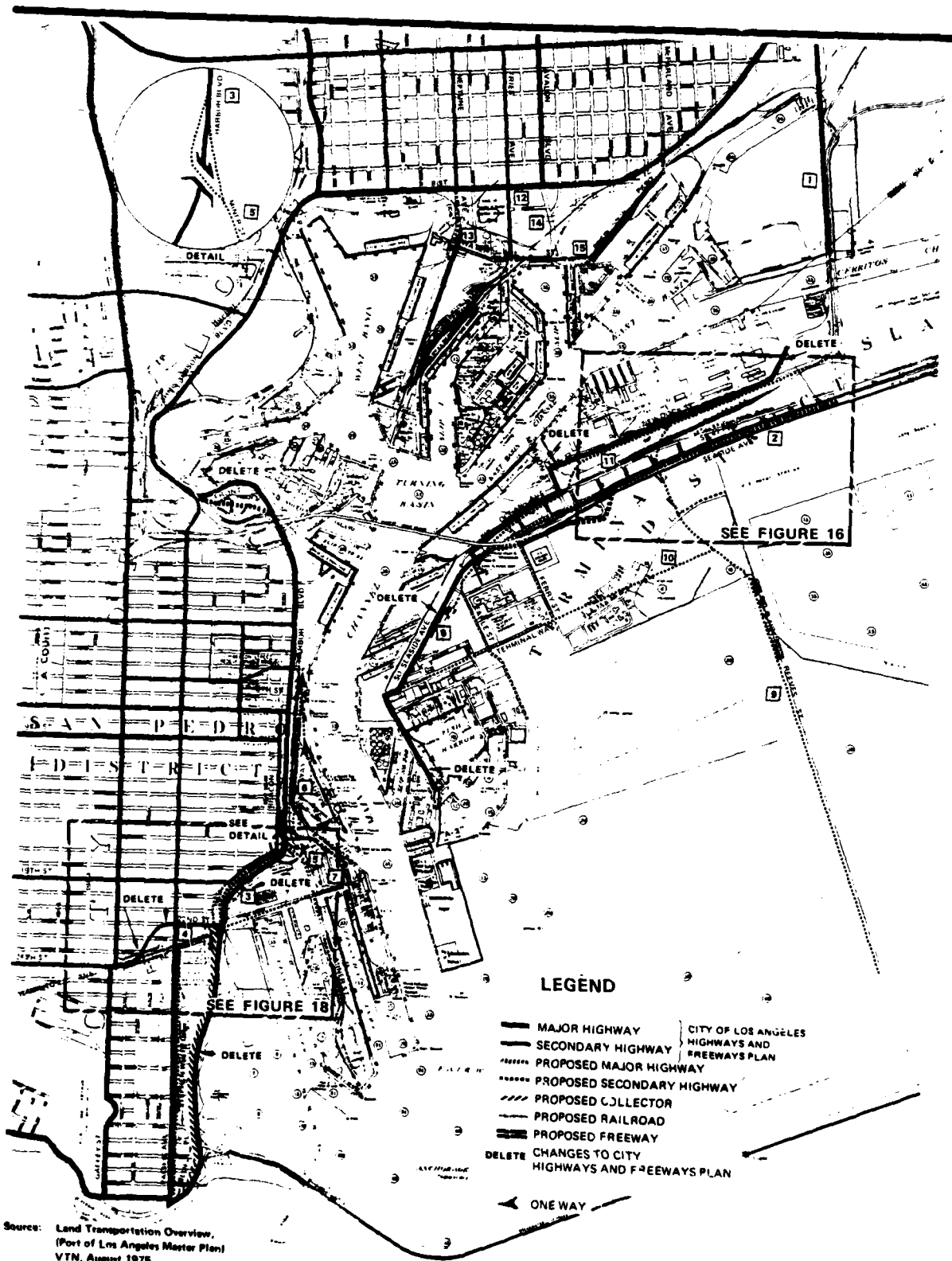
- PROPOSED MAJOR HIGHWAY
- - - PROPOSED SECONDARY HIGHWAY
- a-h KEYED TO TEXT



Source: Land Transportation Overview.
(Part of Los Angeles Master Plan)
VIN, August 1975

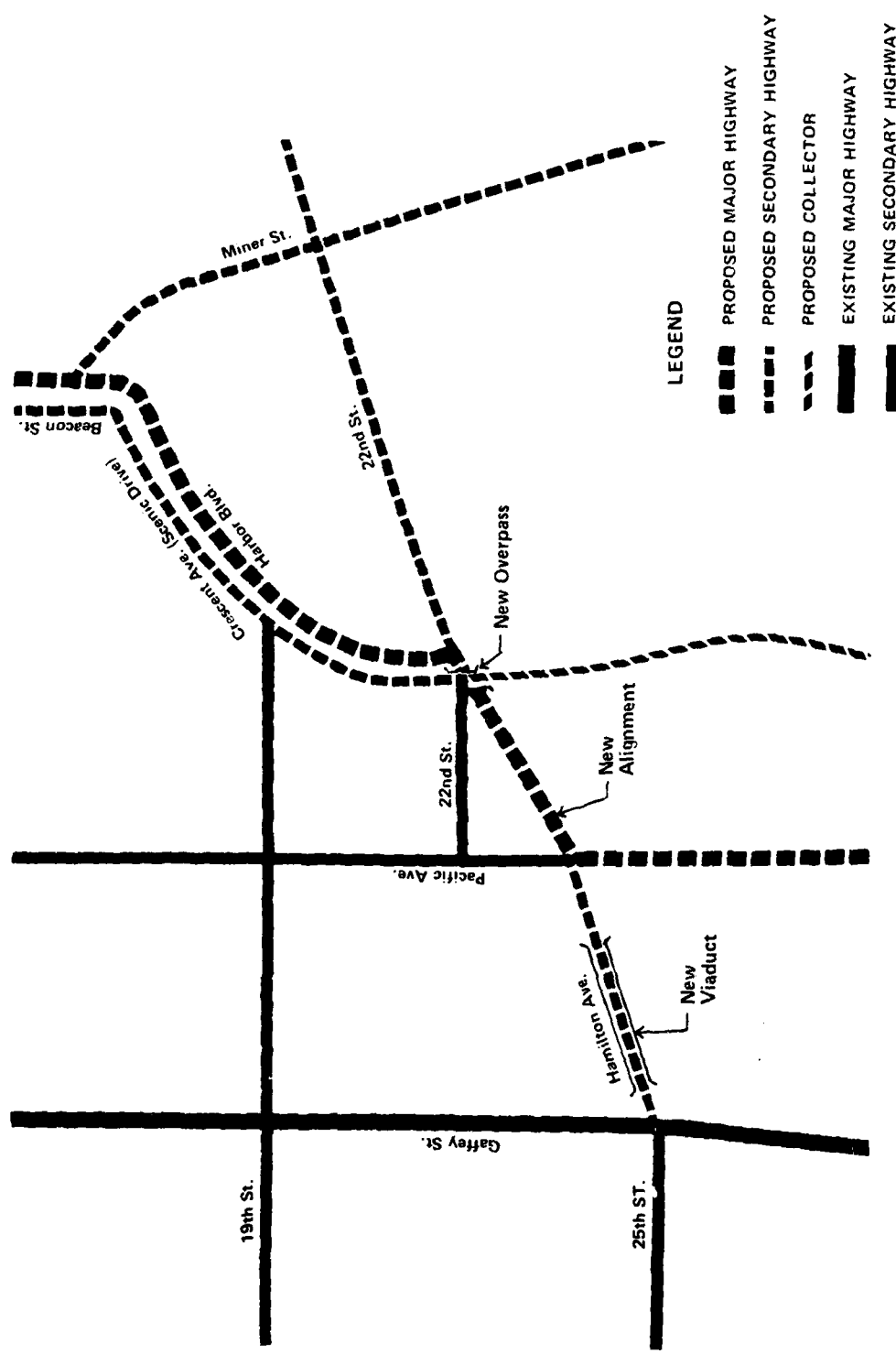
PROPOSED CIRCULATION DETAIL A

FIGURE 16



PROPOSED CIRCULATION PLAN

FIGURE 17



Source: Land Transportation Overview.
(Part of Los Angeles Master Plan)
VTN August 1975.

PROPOSED CIRCULATION DETAIL B

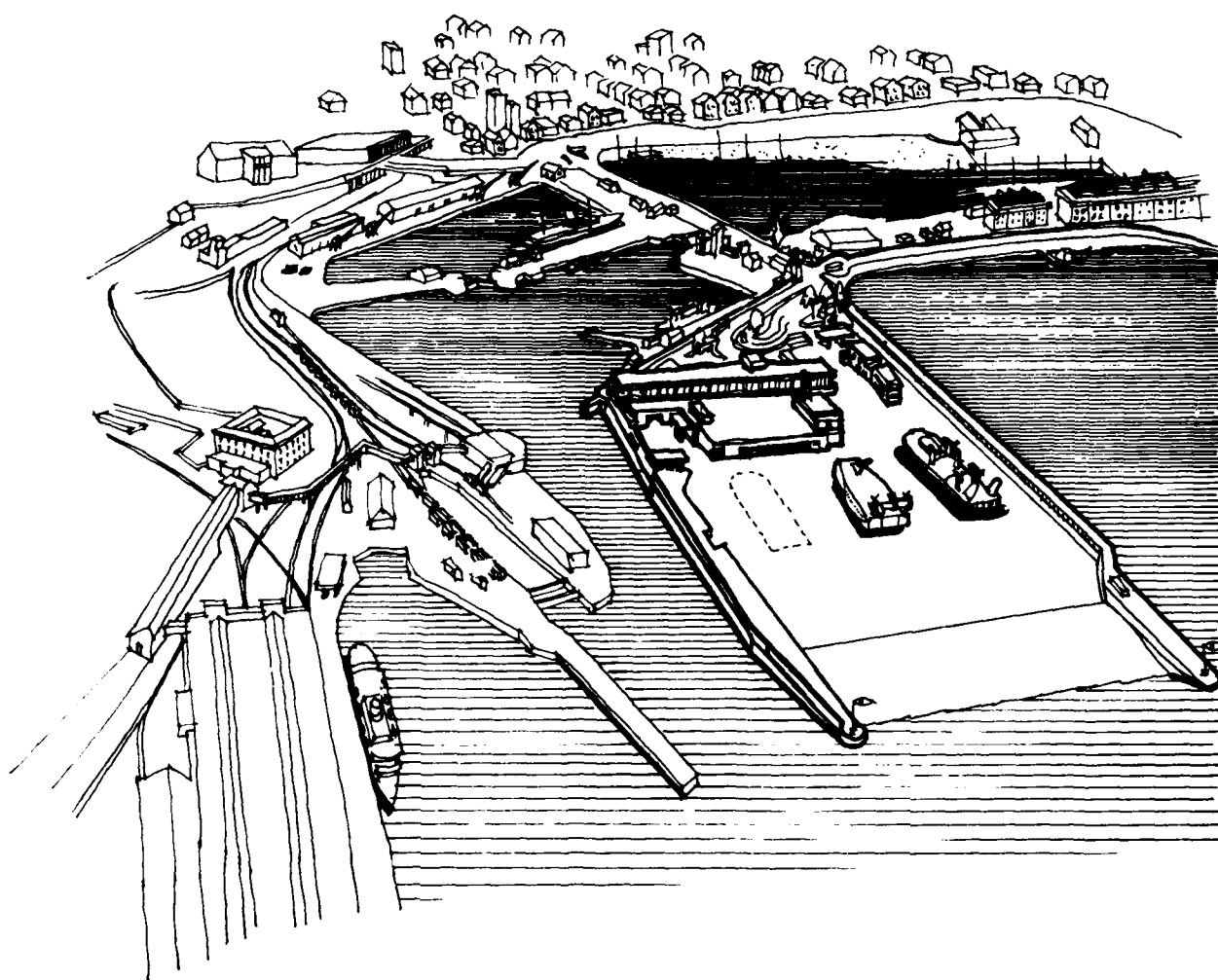
FIGURE 18



Source: Ray Herbert, "Southland's Freeway Program Slowly Dying,"
Los Angeles Times, 11 March 1973.

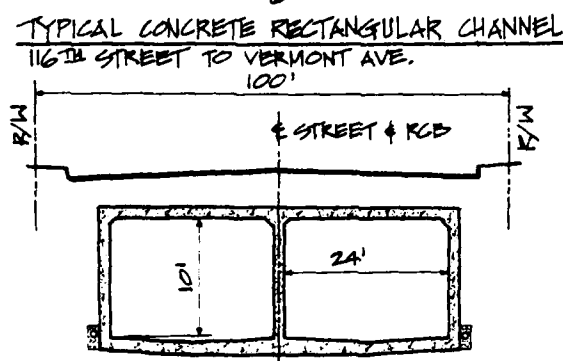
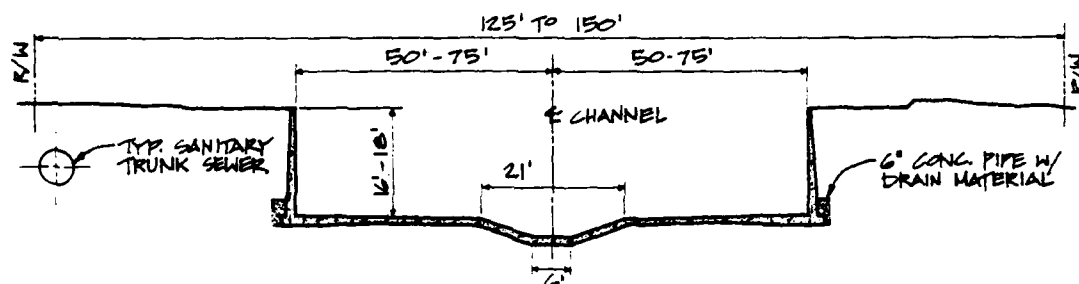
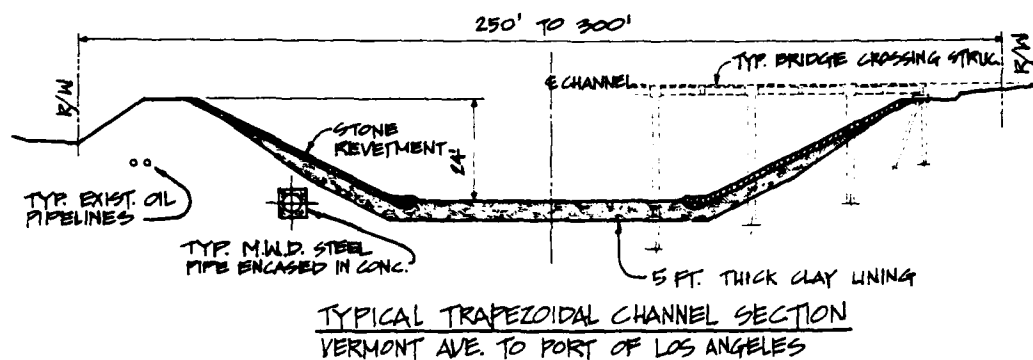
1974 FREEWAY NETWORK PLAN

FIGURE 20



ACV TERMINAL CONCEPT

FIGURE 22



DOMINGUEZ CHANNEL TYPICAL SECTIONS

FIGURE 25



PROPOSED MONORAIL TRANSIT

FIGURE 26

AD-A171 545

RECONNAISSANCE REPORT ON SAN PEDRO PORTS CALIFORNIA(U)
UIN CONSOLIDATED INC IRVINE CA JAN 79 DAC 489-78-C-0025

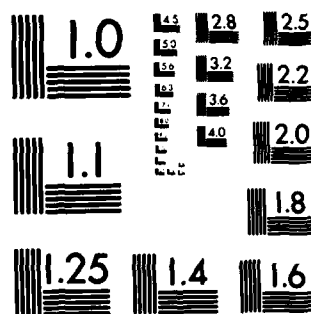
2/3

UNCLASSIFIED

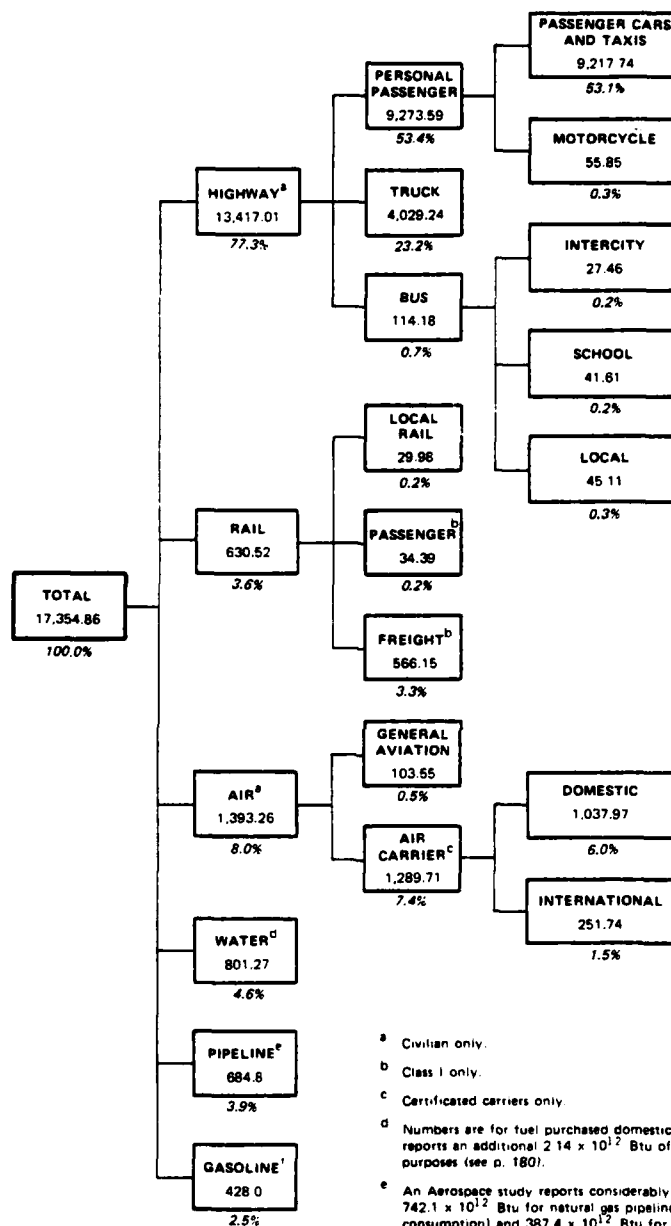
F/G 15/3

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



^a Civilian only.

^b Class I only.

^c Certificated carriers only.

^d Numbers are for fuel purchased domestically. An ERDA-sponsored study done by Booz-Allen reports an additional 2.14×10^{12} Btu of fuels purchased overseas in 1974 for U.S. Commerce purposes (see p. 180).

^e An Aerospace study reports considerably higher energy consumption for pipelines: 742.1×10^{12} Btu for natural gas pipeline in 1970 (93% of which is natural gas consumption) and 387.4×10^{12} Btu for oil pipeline (78% of which is electricity consumption).

^f Gasoline other than that used by highway, marine or air which is reported to FHWA. This is probably gasoline used by pipelines.

P - Preliminary.

NA - Not Available

Source: Transportation Energy Conservation Data Book, Edition 2
Oak Ridge National Laboratory, October 1977

ENERGY USED BY MODE OF TRANSPORT, 1974 (10¹² Btu)

FIGURE 28

CHAPTER IV

ENVIRONMENTAL ASSESSMENT AND EVALUATION

This Environmental Assessment (EA) is a planning stage evaluation of the probable overall effects of an alternative transportation plan for the San Pedro Ports. The evaluation of environmental impact has been performed as an overall qualitative assessment of the potential effects of each of the seven proposed modal alternatives (railways, transit, waterways, highways, flood control channels, aviation and pipelines) and of the transportation plan as a whole. This assessment is designed to provide an indication of the probable impacts of the transportation plan, and to aid in the production of the final plan and subsequent environmental documentation.

Part A provides a delineation of the pertinent elements of the environmental setting in the San Pedro Ports area. Part B identifies the probable effects of each of the seven alternative transportation modes, and evaluates the probable cumulative effects of the transportation plan as it is proposed in Chapter III.

A. Baseline Condition

1. Air

The study area is located in the South Coast Air Basin, which includes the ports of Los Angeles and Long Beach as well as the San Pedro area. The airborne pollutants of greatest concern in the California South Coast Air Basin are particulates, sulfur dioxide and oxidants. Oxidants, usually measured as ozone, are secondary pollutants produced by the photochemical reaction of unsaturated hydrocarbons and nitrogen oxides in the atmosphere in the presence of sunlight. Transport of air pollutants is limited because of the light winds that generally prevail, and vertical dispersion is frequently restricted to a relatively shallow layer by a temperature inversion. Pollution levels frequently exceed the air-quality standards throughout the entire basin.

Of the various transportation modes being evaluated in the proposed project, the most significant air-pollution sources are motor vehicles. In 1976, the total particulate and gaseous emissions from motor vehicles, (light-duty gasoline vehicles (automobiles), heavy-duty gasoline vehicles, heavy-duty diesel vehicles, and motorcycles) in South Coastal Area 4, which includes the Long Beach and San Pedro areas, amounted to 936,460 pounds per day (South Coast Air Quality Maintenance District, 1976). The pollutants included in this inventory were carbon monoxide, total hydrocarbons, nitrogen oxides, sulfur oxides and particulates. (See the following table.) The motor-vehicle emissions represent about 60 percent of the combined stationary and mobile source pollutant burdens.

AIR

SOUTH COASTAL AREA 4 (66,855 ACRES) (1976 AVERAGE POLLUTANT EMISSIONS¹⁾)

POUNDS/24 HOUR WEEKDAY

Sources of Emissions	Carbon Monoxide	Total Hydrocarbons	Nitrogen Oxides	Sulfur Oxides	Particulates
Vehicular					
Light Duty Gasoline	644,240.9	63,551.7	76,699.9	2,191.8	10,923.1
Heavy Duty Gasoline	65,430.3	7,665.4	6,883.8	212.9	567.7
Heavy Duty Diesel	16,866.8	2,498.0	24,808.6	2,141.7	1,249.5
Motorcycles	<u>7,576.3</u>	<u>2,882.0</u>	<u>21.8</u>	<u>0.0</u>	<u>43.7</u>
Subtotal Vehicular	734,114.3	76,597.1	108,414.1	4,546.4	12,784.0
Stationary	2,021.9	194,950.1	211,155.5	236,644.9	33,623.3
Total	736,136.2	271,547.2	319,569.6	241,191.3	46,407.3

POUNDS/WEEKDAY HOURS 6:00 a.m. THRU 9:00 a.m. (LOCAL TIME)

Vehicular					
Light Duty Gasoline	122,204.9	12,055.0	14,549.1	415.7	2,072.0
Heavy Duty Gasoline	12,411.4	1,454.0	1,305.8	40.4	107.7
Heavy Duty Diesel	3,199.4	473.8	4,705.9	406.3	237.0
Motorcycles	<u>1,437.1</u>	<u>546.7</u>	<u>4.1</u>	<u>0.0</u>	<u>8.3</u>
Subtotal Vehicular	139,252.8	14,529.5	20,564.9	862.4	2,425.0
Stationary	256.5	25,263.0	26,226.3	29,411.7	4,273.7
Total	139,509.3	39,792.5	46,791.2	30,274.1	6,698.7

1) Emissions from miscellaneous area sources, Jet aircraft, Piston aircraft, Railroads, Ships and other off-road vehicles are not included.

Source: Ref. SCAQMD 1976.

The most significant pollutants in the South Coast Air Basin are hydrocarbons and nitrogen oxides, as precursors to the formation of photochemical oxidants. Sulfur oxides are also of increasing concern, since the combustion of sulfur-containing liquid and solid fuels contributes to the sulfur oxides emissions in the south coast region. This gaseous pollutant is converted to sulfate aerosols, through complex photochemical atmospheric reactions, which contribute to the incidence of smog-type pollution in the basin.

The air-quality levels in the South Coast Air Basin have not yet met either the federal or state standards. In the Long Beach region, photochemical oxidants have exceeded the California standards a total of four times in 1975, while visibility-reducing aerosol levels have been in noncompliance 234 times during this same year (SCAQMD 1975). These violations are caused by the emission of reactive hydrocarbons, nitrogen oxides and sulfur oxides.

2. Biology

Alteration of the terrestrial and marine communities at the mouth of the Los Angeles River has been an ongoing process for nearly 100 years. Population growth in the Los Angeles basin and the associated increase in water-borne commerce has resulted in major modifications to the port, with a subsequent degradation or elimination of the endemic biotic assemblages. Dredging and filling of the mudflats and marshes historically present at the San Pedro Ports have caused primary ecological modifications, many of which have resulted in the loss of certain faunal groups and the introduction of others. Until 1970, untreated waste discharges into the harbors reduced water quality to such toxic levels that only microbiotic organisms could exist. Actions by the State Water Quality Control Board to reduce or eliminate waste discharges into the harbors have had affirmative effects. Benthic (bottom-dwelling) organisms are now found throughout the harbors and an increasingly important anchovy and sardine fishery has become established within the breakwater (Stephens, 1977). By 1978, the increase in diversity and abundance of marine organisms has reached levels higher than those of the previous 60 years (Oguri, 1977).

a. Terrestrial Environment

Historically, all the native vegetation has been removed through the development of the ports. Only those species which can reinvade exposed soil presently exist. Ornamental trees and shrubs used in landscaping do have some wildlife value and are attractive to certain wildlife species.

Terrestrial wildlife which inhabit the ports and their vicinity are very limited. Certain human-oriented wildlife (primarily introduced

species) such as Norway rats, rock doves and house sparrows exist in this urban environment. The only terrestrial-oriented native wildlife that frequent the ports would be strictly migratory birds, temporarily attracted to the ornamental vegetation.

b. Freshwater-Aquatic Environment

The only two sources of freshwater into the harbor are the Los Angeles River and the Dominguez Channel. Both are cement-channelized for flood control. Marine tidal flow causes fresh water to enter the harbor only during periods of low tide or flood runoff. There is no freshwater aquatic vegetation, and wildlife is restricted to occasional migratory waterfowl. There is no significant freshwater fishery within the primary study area of the ports transportation plan.

c. Marine Environment

For the purpose of this analysis, the marine ecosystem shall consist of the aquatic elements living in or utilizing the harbor and the salt-water-intrusion limits of the Los Angeles River and Dominguez Channel; the analysis also includes the wildlife and vegetation which are dependent upon the ocean or its influence for their basic survival.

The following is a discussion of items pinpointing the biologically sensitive areas which will in some way be affected by the proposed transportation alternatives:

- Plankton and Pelagic Fisheries
- Benthic Invertebrates
- Mammals
- Marine-associated Avifauna
- Endangered Species.

Plankton and Pelagic Fisheries: Plankton are minute organisms suspended in the water column which are directly influenced by circulation patterns. They have the locomotive ability to rise vertically as part of their diurnal feeding behavior, but they are too small to significantly alter their horizontal position (Dawson, 1977).

The distribution of plankton within the harbor is uneven, with distinct variations between the inner and the outer areas. Ogouri and Dawson (1977) sampled and identified plankton and noted distinct differences in distribution patterns between the inner and the outer harbors. They attribute this distinction primarily to the concentration of dissolved oxygen, pH, and salinity. At one time, the inner-harbor biota (particularly within areas experiencing little tidal flushing) was limited to microbial and fouling organisms. As the water quality improved, planktonic organisms were again reintroduced throughout the harbor (Bright, 1976).

The presence of several significant pelagic fisheries within the harbor attest to the successful reduction in the historically poor water quality. Anchovy (Engraulis mordax) and sardine (Sardinops sagax caeruleus) are the two primary nurseries utilizing the harbor, and they play a significant role in the reduction of zooplankton and the support of predatory fish.

The total fish population of the harbor is exceedingly rich, undoubtedly correlated to the system of breakwaters and adequate circulation patterns, and an enriched nutrient source (i.e., cannery effluent). The dynamics of the fish population are complex, but reasonable models have been developed linking their success to planktonic productivity and water quality.

Benthic Invertebrates: Benthic organisms include bottom-dwelling annelids and mollusks existing within the mudflats and feeding by either filtering or predation. The most abundant group, the polychaete annelids, have been identified at a variety of bottom depths. They are the most sensitive to changes in dissolved oxygen (Fuchald, 1977). Mollusks are associated with shallow water and are sensitive to increases in salinity and dissolved or suspended particulates. Both taxa are excellent indicators of water quality within the harbor. Figure 30 indicates shallow water habitats which are important not only to benthic invertebrates but also to marine avifauna and fisheries.

Marine Mammals: The California Sea Lion (Zalophus californicus) has been known to utilize the harbor area for feeding and loafing. Sightings within the mouth of the Los Angeles River have been observed (pers. comm., D. Nitzos). There seems to be no dependence of the sea lion on the harbor, since most sea lions prefer to maintain a buffer between commercial/recreational activity and their foraging grounds.

Marine-associated Avifauna: There is an extensive use of the harbor by marine avifauna, particularly within the outer harbor. Bird use is concentrated along the shores, breakwaters and near fishing boats, as shown in Figure 30. In a two-year study conducted in 1974 (Hardy, et al.), 80 species were identified and classified according to feeding preferences and use of the harbor (i.e. nesting, feeding, and resting).

The dominant species are the Western Gull (Larus occidentalis) and the California Gull (Larus californicus) with the two species being distributed throughout the area. The protective breakwaters show the most concentrated use by shore birds, which also utilize some of the sandy areas. The factors of greatest importance to the avian diversity and abundance are availability of habitat and lack of human disturbance.

Endangered Species: There are two species of endangered wildlife which occur within the harbor area. The California Brown Pelican (pelecanus

occidentalis) utilizes the breakwater and the outer harbor for feeding, and the California Least Tern (Sterna albifrons browni) feeds and nests within the harbor. These are illustrated on the following page.

The California Least Tern, a federally-classified endangered species, is a migratory shore bird which has historically nested in the coastal dunes within study area. These birds have recolonized an abandoned airfield (Reeves Field), as shown in Figure 30. They are nesting on a strip of weathered sand-covered asphalt which structurally resembles their historic nesting habitat. These birds are migratory, nesting in Southern California from April through August. They are dependent upon a steady supply of anchovy and small fry. Besides a steady food supply and an adequate nesting site, their only other habitat requirement is lack of disturbance during their period of nesting. If disturbed during the time they are actively establishing their nest site, the entire colony will vacate the site and probably seek an alternative nest site. Reeves Field is the only remaining actively used Least Tern nest site in the immediate vicinity of the ports.

3. Geology

a. Geological Setting

The San Pedro Ports area is located on the southwestern block of the Los Angeles Basin, a topographic low plain extending from Santa Monica at the northwest to Long Beach at the southwest. To the west, this low plain is interrupted by the Palos Verdes Hills, which form an uplifted peninsula jutting into the Pacific Ocean. The sea floor within the San Pedro ports area has been modified by dredging and filling. Relevant to the Port of Los Angeles, the sea floor is 35 feet below mean lower low water (MLLW) in the main channel, 51 feet MLLW in the Fairway, 40 to 45 feet MLLW in the outer anchorages, and from 0 to 30 feet MLLW in remaining areas of the harbor (L.A. Harbor Map, 1974). Relevant to the Port of Long Beach the water depths vary, the following being those below the MLLW for the more important areas: Main Channel - 60 feet; West Harbor - 48 feet; boundary LA/LB - 36 to 49 feet; Middle Harbor - 30 to 59 feet; Southwest Harbor - 30 to 72 feet; navigation area (Queens Gate to Outer Harbor - 62 to 70 feet; Southeast Harbor (including Piers F and G and parts of piers A and J) - 46 to 56 feet (Port of Long Beach Master Plan, 1978).

b. Seismicity

The San Pedro Ports area is situated in an area with a high level of seismic activity. This activity can be related to the tectonic setting of the region, in particular its location on the edge of the Pacific Plate. Much of the historic seismic activity in this region is directly associated with known active faults. (A fault is considered active if there has been recent displacement of one of the sides in relation to the other one, parallel to the fault.) There is, however,



BROWN PELICAN
(Approx. Scale 1/10 full size)



LEAST TERN
(Approx. Scale 1/4 full size)

uncertainty about the activity of some of the known faults, namely the Palos Verdes and Cabrillo faults.

The recorded historic seismicity since 1932 shows that the majority of epicenters for the larger events are located along or near the Newport-Inglewood fault zone to the east. Recorded earthquake seismicities of faults in Southern California are given in the following table. The active faults which represent the greatest concern to the ports area are the Newport-Inglewood fault zone near Long Beach and the San Andreas fault zone to the east and north. The Newport-Inglewood fault zone, located six miles from the ports area, could perhaps generate an event of magnitude 6.5 to 7 on the Richter scale; the San Andreas fault, located 54 miles from the ports area, could probably generate an event of 8 to 8.5 magnitude. Maximum magnitudes are summarized in the following table (Woodward-Clyde, undated).

A portion of the Palos Verdes fault apparently passes beneath the proposed ports area, but it shows neither historic nor geomorphic evidence of movement. Onshore there is no evidence of Holocene movement; the last faulting occurred between 11,000 and 2 million years ago. Indirect evidence by the U.S. Geological Survey indicates that the southern offshore portion of this fault zone could extend to the sea floor and that it might cut Holocene sediments. Due to the lack of Holocene displacement onshore, the Palos Verdes fault zone is not classified as an active fault, although there have been instrumentally recorded low magnitude events along the zone. Thus, although there might be a possibility of some renewed movement on the fault zone, the probability of activity is low, with no movement on at least the onshore segment in the last 11,000 years (Woodward-Clyde).

The Cabrillo fault, located outside the harbor area to the southwest, trends in a southeasterly direction from the crest of the Palos Verdes Hills across the Point Fermin area. There is no evidence to indicate that the fault is active or potentially active.

The maximum credible or design magnitude of an earthquake on the Newport-Inglewood fault is rated at 7.1, and on the Palos Verdes fault at 7.2 on the Richter scale. The maximum expected bedrock acceleration in the harbor area from such shocks is greater than 0.5g (South Coast Regional Commission, 1974).

c. Subsidence

Tectonic subsidence from natural crustal movements is a slow geologic process which would have negligible impact on facilities within the port areas. However, ground subsidence caused by fluid extraction from sedimentary strata can be significant. Subsidence from oil extraction in the Wilmington oil field, centering at the northeast corner of Terminal Island, has been noticed since 1938, and it totals more than

GEOLOGY

SIGNIFICANT FAULTS AND POTENTIAL SEISMICITY

Fault Name	Approximate Distance from Port	Fault Length	Fault Classification	Maximum Historical Magnitude	Maximum Credible Magnitude	Estimated Maximum Acceleration
Newport-Inglewood	6 mi	50 mi+	Right Lateral	M6.3	M7.1	0.50 g
San Andreas	54 mi	600 mi+	Right Lateral	M8+	M8-1/2	0.20 g
Norwalk	15 mi	9 mi	Normal	M4.7	M6-1/4	0.20 g
Whittier	22 mi	28 mi	Right Lateral -- Thrust	M3.7	M6.8	0.20 g
Santa Monica-Malibu Coast	25 mi	60 mi	Left Lateral	M5-3/4	M7-1/4	0.25 g
Sierra Madre	32 mi	36 mi	Thrust	M3.6	M7.0	0.15 g
San Jacinto	52 mi	134 mi	Right Lateral	M6-3/4	M7-1/2	0.10 g
Palos Verdes	0 mi	24 mi+	Right Lateral -- Thrust ¹	NONE	M7.2	0.50 g
Southern Palos Verdes Offshore	2 to 8 mi	30 mi	Right Lateral -- Thrust(?) ²	NONE	—	—
Cabrillo	1 mi	7 mi+	Right Lateral	NONE	—	—

¹ No Holocene movement

² Possible Holocene movement indicated indirectly

Source: Adapted from Woodward-Clyde and VTN, 1978.

29 feet of downward sinking (South Coast Regional Commission, 1974). Repressuring of the oil reservoirs by water injection has stopped subsidence in the port areas, and there has been recovery of over one foot in elevation in some locations (City of Long Beach).

4. Noise

Acoustical measurements have shown that the existing noise levels in the nearest residential communities range from about 52 to 57 dBA during the day and from about 42 to 54 dBA at night (Draft Environmental Impact Report, Master Environmental Setting, Port of Long Beach, 1976; Environmental Impact Report, Los Angeles Harbor Department, September, 1976). Sound levels with the corresponding human responses are shown in the following scale, and it can be seen that these sound levels may be classified as "quiet." These values are representative of a typical residential area, although some complaints from people living in adjacent areas have occasionally been filed because of construction activity and operations at some of the noisier facilities in the Ports (pers. comm. Don Rice, Los Angeles Harbor Department, 1978).

The noise ordinances for the City of Los Angeles and the City of Long Beach are summarized in the following table. Noise levels surrounding airports, freeways and waterways are regulated by other agencies. Construction activities that cause a noise disturbance are prohibited in Los Angeles between 9:00 p.m. and 7:00 a.m. and in Long Beach between 10:00 p.m. and 7:00 a.m.

NOISE ORDINANCES dBA

Land Use	<u>Los Angeles</u>		<u>Long Beach</u>	
	<u>Day</u>	<u>Night</u>	<u>Day</u>	<u>Night</u>
Residential	50	40	50	45
Commercial	60	55	60	55
Industrial	65	65	65	65

Source: City of Long Beach 1977 and City of Los Angeles 1975

5. Water

a. Fresh and Marine Waters

The San Pedro ports are enclosed by three breakwater sections: the San Pedro breakwater, the middle breakwater and the Long Beach breakwater. The total water area protected by these breakwaters is approximately 22 square miles. In general, San Pedro ports consist of the shallower,

TYPICAL "A" WEIGHTED SOUND LEVELS AND HUMAN RESPONSE

SOURCE SOURCE	dBA*	RESPONSE CRITERIA
Carrier Deck Jet Operation	150	
	140	Painfully Loud Limited Amplified Speech
	130	
Jet Takeoff (200 feet)	120	Maximum Vocal Effort
Discotheque		
Auto Horn (3 feet)		
Riveting Machine		
	110	
Jet Takeoff (2,000 feet)		
Shout (0.5 feet)	100	
	90	Very Annoying Hearing Damage (8 hours)
N. Y. Subway Station		
Heavy Truck (50 feet)		
	80	Annoying
Pneumatic Drill (50 feet)		
Freight Train (50 feet)		
	70	Telephone Use Difficult Intrusive
Freeway Traffic (50 feet)		
	60	
Air Conditioning Unit (20 feet)		
	50	Quiet
Light Auto Traffic (50 feet)		
	40	
Living Room		
Bedroom		
	30	Very Quiet
Library		
Soft Whisper (15 feet)		
	20	
Broadcasting Studio	10	Just Audible
	0	Threshold of Hearing

*Typical A-Weighted sound levels taken with a sound level meter and expressed as decibels on the scale. The "A" scale approximates the frequency response of the human ear.

Source: Environmental Quality — The First Annual Report of the Council on Environmental Quality. Council on Environmental Quality, Transmitted to Congress, August 1970.

more protected waters off the south coast bordering the southern California Bight. The harbor areas are considered an estuarine environment, rather than a true estuary, because of the annual rainfall of 6 to 14 inches (NWS, 1976) generally during the winter months only. This estuarine environment was originally formed by the Los Angeles and San Gabriel Rivers, with the Palos Verdes Peninsula to the west. The Los Angeles River was diverted into a flood-control channel emptying into Long Beach Harbor to control debris and suspended sediment discharge into the Harbor. The San Gabriel River empties into Alamitos Bay and Anaheim Bay. Both the Los Angeles and San Gabriel Rivers are channelized. The flow in the river beds is regulated by flood-control dams constructed upstream. Considerable debris is carried down these rivers during the first major rainstorm of the year.

The water regime in the nearshore coastal waters and southbound California currents strongly influences the Los Angeles and Long Beach harbors (Soule, 1974). Tides within the harbor are characterized as being the mixed type with diurnal and semidiurnal components (USC-Allen Hancock Foundation, 1974). The U.S.G.S. and U.S. Coast Guard reported a mean tidal range of 3.8 feet with a maximum range of 10.2 feet. The circulation in the harbor waters induced by wind and tidal action affects sediment transport and water quality.

Water quality within the San Pedro Ports is greatly affected by surface runoff from the San Pedro Bay area. Surface runoff affects water quality of marine waters, since it transports contaminants into port waters.

Contamination and pollution from storm and nuisance water runoff are of great concern in many sections of the San Pedro ports. The Los Angeles River and the Dominguez Channel discharge into the San Pedro Harbor and can thus transport significant quantities of suspended sediments and contaminants into the harbor waters. The dissolved contaminants removed from the atmosphere during precipitation, e.g. petroleum hydrocarbons and trace metals washed from impervious areas as well as those previously deposited in drainage systems, are concentrated and transported by the drainage system.

In addition to surface runoff, other contaminants include controlled wastewater discharges from ships and accidental spills. Accidental spills in any of the waterways or flood-control channels would eventually affect the harbor marine waters. Elevated levels of trace contaminants (metals and organics) would be parameter indicators of the severity of the spill. Current measures designed to minimize these impacts include: compliance with dockside transfer and safety regulations, control of surface runoff from areas around cargo-handling facilities, and regular cleanup of surface areas subject to contamination.

b. Ground Water

The ground waters of the San Pedro ports area are already significantly intruded upon by sea water. To prevent further salt-water intrusion, the Los Angeles County Flood Control District has constructed the Dominguez Gap Barrier, where fresh water is injected into the aquifers through a series of wells. The operation does create a barrier to intrusion. The barrier is, however, located inland so that the ground water under the ports complex remains saline.

Accidental spills of nonviscous chemicals which might occur over a pervious layer would eventually percolate into the ground waters, causing further contamination.

6. Aesthetics

The aesthetic quality of the port area (study area) is considered "not scenic" by aesthetic standards. It is an industrial area which does not have many scenic or aesthetic qualities. However, there do exist some surrounding attractions that bring people into the port area, but these places are not considered part of the study area.

7. Cultural Resources

a. Historic

Although the ports area has a rich history (Los Angeles-Long Beach Harbor Areas, Regional Cultural History, April, 1978), there are few landmarks in the area. Among the most well known landmarks are:

- the redwood gates at the Todd Shipyard marking the original entrance to the shipyards (designated landmark of the San Pedro Bay Historic Society)
- the mast of the USS Los Angeles in John Gibson Park on Harbor Boulevard between 5th and 6th Streets (designated landmark of the Cultural Heritage Board, City of L.A.)
- the Ferry Building along the Main Channel west of Harbor Boulevard (designated landmark of the Cultural Heritage Board, City of L.A., and the San Pedro Bay Historic Society and possible future federal landmark)
- Seaside Elementary on Terminal Island, the first schoolhouse in the area (designated landmark of San Pedro Bay Historic Society; land owned by federal government; present occupancy by Marine Corp Reserve; federal historic status pending)
- Fireboat #2, the Ralph J. Forbes, and Firehouse No. 112 on Terminal Island near the Vincent Thomas Bridge (designated landmark of Cultural Heritage Board, City of L.A.)

- the Drum Barracks in Wilmington, built during the Civil War (designated landmark of Cultural Heritage Board, City of L.A.)
- the Pt. Fermin lighthouse at the extreme end of Gaffey Street, San Pedro (designated national landmark by the federal government).

b. Paleontology

The record of fossil vertebrates in the ports area is relatively extensive. Vertebrates are known from most of the sedimentary formations exposed in the San Pedro and Long Beach areas. Those of the Miocene and Pliocene formations are scanty and poorly documented. Pleistocene outcrops of the Timms Point Silt and San Pedro Sand have yielded specimens of approximately 150 taxa. These have been documented in numerous papers (see Marine Studies of San Pedro Bay, Part 9, the Allan Hancock Foundation, 1975). Little is known about the fossil amphibians and reptiles of the Harbor area for paleontological interpretation.

c. Archaeology

Much of the harbor area has been modified through harbor construction. Dredging, piling and landfill operations have changed the original bay and estuarine marsh landscape into an industrial area. All these activities may have destroyed prehistoric sites or may have redeposited important cultural remains in the study area. The 18 reported archaeological sites are listed below by the USGS 7.5 minute map on which they are located. None of these sites are listed on the National Register of Historic Places, although all of them may qualify for such status.

Reported Sites References (UCLA Site Files)

San Pedro Quadrangle			
CA-LAn-144	Bucknam 1974, UCLA	CA-LAn-147	Bucknam 1974, UCLA
CA-LAn-145	Bucknam 1974, UCLA	CA-LAn-282	Bucknam 1974, UCLA
CA-LAn-146	Bucknam 1974, UCLA		Butler 1973, Desautels 1968
Torrance Quadrangle			
CA-LAn-149	Bucknam 1974, UCLA	CA-LAn-285	Bucknam 1974, UCLA
CA-LAn-150	Bucknam 1974, UCLA		Racer 1939
Long Beach Quadrangle			
CA-LAn-231	Bucknam 1974, UCLA	CA-LAn-698	UCLA
CA-LAn-236	Bucknam 1974, UCLA	CA-LAn-700	UCLA
CA-LAn-693	UCLA	CA-LAn-701	UCLA

	Los Alamitos Quadrangle		
CA-LAn-102	Bucknam 1974, UCLA	CA-LAn-272	Bucknam 1974, UCLA
CA-LAn-232	Bucknam 1974, UCLA		Brooks, Conrey and
	Dixon 1972		Dixon 1965
CA-LAn-233	Bucknam 1974, UCLA		
	Dixon 1972		

Source: Los Angeles - Long Beach Harbor Areas Regional Cultural History, Los Angeles, California: U.S. Army Corps of Engineers, April, 1978.

8. Socioeconomics

A variety of public and private service systems serves the ports area. For discussion, the various services can be grouped as public health and safety services, community services and utility services.

a. Public Health and Safety

The applicable public health and safety services in the ports include fire protection (Los Angeles fire stations) and police protection (Harbor Security Force assisted by the Los Angeles Police Department and Long Beach Police Department unit) (Radomski, pers. comm.). In addition, there are environmental quality services such as flood control, sewage discharge and treatment, industrial waste management, water quality control and public works. These support services are provided by city agencies, port personnel and private organizations.

b. Community Services

Community services within the port area include libraries, educational facilities, park and recreation facilities and entertainment facilities. The City of Los Angeles maintains one library in Wilmington and one in San Pedro, while the City of Long Beach has one main library and 11 branch libraries.

Educational facilities include 10 public schools, three parochial schools and one junior college in San Pedro; 12 preschools, 16 public schools and three parochial schools in Wilmington; and 30 parochial schools, 18 preschools, numerous public schools, one city college and one state university in Long Beach. These facilities are not in proximity to the study area but are on the outskirts of it.

Park and recreation facilities include parks and boat launching facilities in San Pedro/Wilmington plus many parks in Long Beach offering a variety of recreational opportunities. In addition, there are numerous marine-oriented recreational activities in the ports area, including small-craft marinas in Wilmington/San Pedro and Long Beach.

There are also several private entertainment and recreational facilities of a marine nature in the ports area, including Queens Park Amusement Center, the Queen Mary in Long Beach, the Ports O' Call, Catalina Island Cruise Ships, sport fishing, the Princess Louise in San Pedro, and other tourist facilities and restaurants located along the shoreline.

Community services at the Long Beach Naval Facilities include the Naval Exchange Service, the commissary, a movie theater and stage, plus numerous recreational facilities.

c. Utilities

In the Los Angeles section of the ports, electricity and water are supplied by the city's Department of Water and Power, with gas and telephone services being provided by private companies. In Long Beach, the city provides natural gas and water supplies, while telephone and electrical facilities are provided by private companies. Service is considered adequate at the present time (Draft EIR, Master Environmental Setting, Port of Long Beach, 1976).

d. Population

The population in the communities which include the ports area has remained stable or has declined in recent years. In 1970, the City of Long Beach had 361,110 inhabitants, 4.3% more than in 1960 (U.S. Bureau of the Census, 1973). The population change during the previous decade was the lowest the city had experienced in several decades (Long Beach City Planning Department, 1974). By 1977, the city's population had declined to an estimated 341,960 (L.A. County, 1977). During this same period (1970-1977), the San Pedro/Wilmington area population climbed 1.2% to 126,227, primarily the result of young minority families moving into the area (Population, Employment & Housing Survey, 1977, Vol. I; City of Los Angeles, January, 1978).

The communities around the ports area have undergone significant ethnic changes in recent years. In Long Beach, the white, non-Hispanic population comprised 81% of the city's total in 1975, down 3.2% since 1970 (City of Long Beach, 1974). In the San Pedro/Wilmington area, the white, non-Hispanic population declined 12.3% to 65,835 between 1970 and 1977. Presently 39%, or 49,311, of the area's population is Hispanic, 20% black (2,970), and 5% Asian-American. In both Long Beach and San Pedro/Wilmington, the number of elderly households has increased. (Population, Employment, & Housing Survey, 1977; Vol. I; City of Los Angeles, January, 1978).

e. Employment

Since 1970, the civilian labor force working in the combined-ports area has ranged between 30,000 and 35,000. No definite employment increases

or decreases have occurred. Instead, the number of employees tends to fluctuate from year to year as shown below:

	<u>Port of Los Angeles</u>	<u>Port of Long Beach</u>
1970	15,365	14,900
1971	16,570	Not Available
1972	15,740	Not Available
1973	16,935	Not Available
1974	17,285	16,000

(Source: Draft EIR, Master Environmental Setting, Port of Long Beach, 1976.)

By December, 1975, a survey by the Long Beach Harbor Department indicated that total employment had decreased to approximately 14,900 in the port. Of this, approximately 35%, or 5,300 persons, were employed on port-owned facilities in the port. An additional 329 people were employees of the Harbor Department, while the remaining 9,240 were working for non-port-related businesses throughout the district (Draft Environmental Impact Report, Port of Long Beach, Vol. 2, 1976). Other employers include tuna factories, the shipbuilding industry and large shipping and petroleum companies. In addition, the staff of the Long Beach Naval Facilities fluctuates between 7,500 and 8,000.

f. Land Use

Land-use activities in the San Pedro, Carson, Wilmington and Long Beach communities surrounding the ports consist of a mixture of commercial and industrial uses in the older residential neighborhoods. There is a considerable amount of vacant land in the area. Located in the ports are mostly commercial and industrial harbor-related facilities. These include facilities for warehousing, import-export activities, light and heavy manufacturing, and oil extraction, as well as oil storage farms, grain silos, and rail classification yards. Tuna factories, shipbuilding yards, and large shipping and petroleum companies dominate the area. Along with the industrial uses, strip commercial and residential activities are in proximity. Other land-use activities are marine-related recreational commercial uses and small boat harbors.

B. Environment Assessment

The Environmental Assessment of the transportation plan is presented in Figure 29 which summarizes the probable environmental effects described in this chapter. The matrix displays the interrelationship between each element of the environment and the seven modal components of, as well as the overall transportation plan. The symbols used in the matrix designate general categories of effects. The symbol (+) indicates a likely enhancement of the existing condition of the specific environmental element. The symbol (-) indicates a degradation of the existing condition of the environmental element resulting from

implementation of the proposed plan. To indicate magnitude, heavy bold symbols (+) and (-) represent significant enhancement or degradation of the existing condition, while light symbols (+) or (-) indicate minor enhancement or degradation. The symbol (0) indicates that no effect is anticipated. Some areas of probable impact could not be accurately summarized within this framework. Therefore, those areas which require additional information or qualification for an accurate evaluation are indicated by the symbol (+).

1. Air

The potential impacts associated with the various transportation modes addressed in the transportation plan are expressed as a function of the pollutant types generated by each transport method and operation. This is illustrated graphically in Figure 31.

Air pollutant emissions will occur during the construction phase of all port projects. In addition, ongoing operations involving rail, motor vehicle, ship and aircraft movements and servicing will entail air pollutant emissions. Stationary sources as product bulk-handling facilities; the storage, transfer and processing of petroleum products; and on-site power plants will also be responsible for air-pollution control. Any electrical energy requirements related to the port operations which will be furnished by central power-generation plants will produce pollutant emissions in the region.

The overall positive objective of the proposed transportation plan is to conserve energy by increasing its utilization efficiency and thereby reducing air-pollution emissions. However, to determine the net impacts, this beneficial effect must be balanced against the increased energy demands of the proposed expanded capacity of the ports.

The current status of the transportation plan is of such a preliminary nature that quantification of the various transportation modes and servicing facilities is not available at the present time. The current environmental assessment should therefore be considered a preliminary analysis. When such project-specific data as rail-miles and motor-vehicle-miles traveled, ship fuel consumption rates, pipeline energy consumption rates, petroleum storage operational parameters, etc., are defined, then net quantitative impacts will be determined. Referring to the engineering alternatives analysis, each of the transportation modes has been evaluated in terms of the four major pollutants which would have the most deleterious effect on air quality: particulates, carbon monoxide (CO), sulfur oxides (SO_x), hydrocarbons and nitrogen oxides (NO_x). The emissions from the various modes are given in the table following. The bases for the assessment of air-quality impacts are:

- Only gross potential effects for each proposed modification have been indicated without consideration of the consequences of the greater capacity of the ports or any mitigative influences.

MAJOR POLLUTANT EMISSIONS ASSOCIATED WITH PROPOSED PROJECT

Operation	Emission Source	Pollutant Emissions				
		Partic.	CO	HC	NO _x	SO _x
Construction	Excavation & Road Building	X				
Operations	Trains (diesel)	X			X	X
	Motor Vehicles		X	X	X	
	Ships	X			X	X
	Aircraft		X	X	X	
	* Pipelines	X			X	X
	Bulk Unloading	X				
	Petroleum Storage			X		
	Crude Oil Unloading			X		
	Power Plants	X			X	X

* Assuming electric power provided by central generating plant.

Source: VTN Estimates, 1978.

- Transportation systems have been assessed during operational modes. Stationary source effects will be addressed at a later date when more specific project plans have been developed.

A description of the pollutant emission effect for each transport mode alternative in the engineering alternatives analysis is given as follows.

a. Railways

<u>Air Resource Pertinent Factors</u>	<u>Pollutant Emissions</u>
1. Fewer rail miles/unit cargo capacity	Less
2. Fewer stop/go movements	Less
3. More efficient container handling	Less
4. Minimum motor vehicle rail crossing interruptions	Less
5. Minimum truck transport activities	Less.

Since the major pollutants related to fuel-oil-motivated rail transport are particulates, SO_x and NO_x , the reduction of these emissions would result in the enhancement of air quality for the three pollutants and minimum effects for hydrocarbons. The most energy effective modal mix with benefits accruing to an improvement in the air quality would be an integrated rail-highway system. The major air resource advantages of increased and more efficient rail utilization will be discussed under the highway alternative.

b. Transit

A variety of incentive plans are to be implemented to replace the automobile with buses and other types of vehicles. Although the immediate effect of an expanded bus service would be to increase diesel-type pollutant emissions, the net effect, based on such ameliorating conditions as more direct routing and less congested driving conditions, are difficult to assess. Therefore the impacts for the three major pollutants generated by diesel buses (i.e., particulates, SO_x and NO_x) will be unknown until more definitive data are available.

The major air pollution abatement effect of an expanded effective mass-transit system is the anticipated reduction of automobiles on the highway, as discussed in the highway section.

c. Waterways

The expansion of the waterways system for transporting personnel and cargo, per se, would cause increases in those pollutant emissions generated by the motive power plant. Based on the assumption that fuel

oil will be used, these pollutants will be primarily particulates, SO_x , and NO_x .

However, transportation mode tradeoffs would result in the replacement of some automobiles and transport trucks on the highways. Energy conversion efficiencies for the water and land transport modes must be determined before a quantitative evaluation can be performed, but the impact, whether positive or negative, would be small.

d. Highways

Because of the significant role of motor vehicles as a contributor to air-pollution degradation, emissions controls for this source play an important role in the evaluation of air resources. Plans by the California Air Resources Board for the enactment and enforcement of more stringent controls plus the gradual retirement of older-model-year cars, with their inefficient smog-control systems, should cause a gradual reduction of pollutant emissions from this major source. If triple-trailer operations ever become legal in California and are accepted by the trucking companies, they too could contribute to the reduction of pollutant emissions.

As discussed earlier, motor vehicle pollutant emissions in the Long Beach region of the California South Coast Air Basin comprise about 60 percent of the total stationary and mobile source emissions. Thus any reduction of automobile and truck traffic or an improvement in circulation patterns could result in a significant beneficial environmental effect.

The actions proposed under the highways alternative are related to roadway improvements, freeway extensions and bridge reconstruction to expedite traffic movements. These plans would reduce motor vehicle pollutant emissions, since smooth uninterrupted traffic flows generate considerably less pollutant material than traffic that is forced to negotiate an inadequate congested circulation pattern. However, these gains must be balanced against the usual expected increase in motor vehicle activity accompanying any "new" freeway construction. Thus, a definition of the actual benefits accruing to these highway improvements must await quantification of traffic flows.

By far the greatest contribution to the reduction of motor vehicle air pollution impacts is the substitution of other transportation modes for trucks and automobiles. The various modal mixes for railroads, transit, waterways and pipelines, defined in the engineering alternatives analysis, if properly implemented, could significantly reduce those pollutant emissions generated by motor vehicles. Thus, as indicated in the Environmental Impact Assessment Matrix, the highway transportation plan may be expected to result in an improvement in the ambient air quality levels.

e. Flood-Control Channels

The same general air pollution effects, as defined for waterways, would be expected for any development of cargo and personnel transportation in the flood-control channels. Although not specifically mentioned in the engineering alternatives analysis, some minimum substitution of highway travel may result from the implementation of this transport mode.

f. Aviation

Any expansion of aviation services would result in a slightly adverse air-pollution impact, mostly from the automobiles and trucks which must serve the facility. Tradeoffs, in terms of traffic reduction in motor vehicle traffic, would be insignificant.

g. Pipeline

Potential air pollution impacts from any pipeline system modifications are those emitted at those central power plants which would furnish power to the pumping stations. In addition, leakages from valves and fill connections would also constitute an air pollution source. However, these impacts could be offset by the elimination of redundant systems and a more direct routing of the lines. As the master plan for pipelines/waterways becomes developed, it will be possible to characterize the effects as either positive or negative.

As in the case of the other transport modes, any reduction of truck traffic as a result of an improvement or an expansion of the pipeline systems would result in a beneficial air quality effect similar to the highway category.

h. Transportation Plan

The transportation plan calls for the possible construction or realignment of freeways, streets, bridges, underpasses, airports, etc. Each of these individual developments will be associated with fugitive dust and other air pollutants liberated from the construction activities and from the construction and support vehicles. These emissions will be short term in nature, with their effects being limited to a local scale. The dust emissions will be kept to a minimum using conventional water-spraying techniques.

2. Biology

a. Railroad

Existing terrestrial vegetation will be removed during the construction phase, and wildlife associated with this vegetation will be excluded. Much of the proposed railway construction closely parallels the Los Angeles River. Any construction activity, unless properly protected,

should be expected to result in silt runoff and introduction of organic petroleum wastes into the river. These contaminants can adversely affect wildlife populations (invertebrates and fish) associated with these freshwater areas. Construction activity will be temporary; however, removal of terrestrial vegetation will affect the potential for habitat.

Construction along the river and within the ports contributes to increased turbidity from silt and organic pollutants of the harbor waters, resulting in a degradation to the marine fisheries. If dredging is associated with the construction activities, then an increased loading of toxic metals can be expected to increase the mortality of some larval and adult fish. Plankton will be similarly affected. Benthic organisms will be eliminated in those areas experiencing silt intrusion and settling.

These impacts are generally considered short term, lasting through the construction phase. The lag between initial impact and recolonization of impacted areas can be many years, depending upon the nature and extent of impacts.

b. Waterways

As utilization and incorporation of increased traffic on the waterways occurs, a decrease in terrestrial vegetation and wildlife associated with them could occur. Most of the wildlife in the ports tolerate the presence of man, but as human activities increase, wildlife will become more restricted.

The marine fisheries can expect some declines due to the proposed increased water traffic and any potential fuel spills and contaminants. Without further studies the exact magnitude cannot be fully understood. If modifications to the marinas require dredging, temporary reductions in water quality and bottom habitat would occur. As water traffic increases, marine mammals, less tolerant of human activities, will further reduce their utilization of the harbor. Since avifauna (excluding gulls) are not tolerant of intense human use, they would be expected to decrease locally in number. Birds must also compete with the increased number of ships and boats occupying the open space they need for fishing. An increase in noise levels can also adversely affect birds, particularly breeding colonies.

Plankton may actually be enhanced in areas of increased water traffic. Studies have shown that the movement of boats increases the level of dissolved oxygen (D.O.) and acts to convey D.O. into lower depths, which would increase plankton productivity and reproduction. The benthos would be adversely affected by decreases in water quality as a result of silt deposition.

There are presently some clam beds located within the harbor area. The location of the beds may be significantly different in the year 2000 due to changes in the base environment. Impacts to clam beds can occur due to wave action from high-speed water transport. Without further detail at this time, the extent of these impacts cannot be proven.

c. Highways

Highway construction will remove existing terrestrial vegetation and affect the associated wildlife. Silt runoff and asphalt organics will eventually enter the freshwater and marine environments through the system of storm drains, causing a reduction in the populations of plankton, benthos and fisheries.

d. Flood-Control Channels

Modifications to the flood-control channel to facilitate access will require major construction, which will result in silt and accidental spills impacting both fresh and marine organisms.

Once use is established, the migratory water birds utilizing the channels will be displaced through the activities of ACVs. Marine mammals in the mouth of the Los Angeles River will also be subject to disturbance from the ACV's.

Marine birds using these traditionally quiet backwaters in the immediate vicinity of the harbor area will be subject to traffic and noise, reducing the use of the channels by the birds. Since the ACV's can travel up onto the land, it is anticipated that many of the shallow sand or mud areas will occasionally see ACV traffic, directly affecting shore birds.

e. Aviation

Reactivation of Reeves Field would cause environmental impacts. The Least Tern is currently utilizing a section of the field for nesting. The deteriorating asphalt structurally mimics a native sand dune, the historic nesting habitat for this colonial bird. The presence of any human activity during breeding and nesting may adversely affect the birds' behavior, causing an abandonment of the nesting site. Use of the site for storage or transportation, if carried on during their nesting cycle, could possibly eliminate the nesting colony. Any resurfacing of the pavement or leveling of the soil might exclude the birds temporarily or permanently.

The use of Reeves Field for storage (without modification of the existing surface) could be successfully implemented without impact to the Least Terns as long as storage is restricted to the periods of nonuse (prior to breeding and nesting and after the fledging of the

young). Precise timing of this restriction could be coordinated with the U.S. Fish and Wildlife Service or the Least Tern Recovery Team to mitigate any expected impacts.

Vegetation will also be cleared to reactivate the field, causing a reduction in associated wildlife. Aircraft collisions with shore birds which are utilizing this site may occur as a result of increased air traffic.

f. Pipeline

There are no anticipated impacts on biology due to using pipeline, unless silt and runoff pollutants associated with the construction activities or seepages due to defective pipes enter the aquatic ecosystems. Those impacts would be similar in nature to potential impacts sustained under the railroad alternative.

g. Transportation Plan

There will be some cumulative impacts as a result of the overall transportation plan. For example, it is expected that the plan will result in a long-term reduction in the port-associated terrestrial wildlife. Intense commercial activity is compatible with only a handful of human-associated wildlife. The same can be said about freshwater wildlife as more activity is concentrated in the flood control channels; wildlife which has become established in those areas will receive increased pressure, resulting in their potential displacement or destruction.

The marine element involves a more complex situation. Elimination of some habitats may reduce the number of individuals and species. These long-term impacts are the real threat to a species survival, not necessarily the short-term, construction-oriented effects. Of all the wildlife and fisheries elements, plankton may indeed increase as long as water quality is maintained through pollution control methods, adequate circulation and increases in D.O.

The remainder of the biotic elements will receive negative long-term impacts as a result of habitat loss. Unless new habitat is created or old habitat enhanced, the plan could reduce species abundance and diversity of the fish, invertebrates, mammals and avifauna currently utilizing the Harbor area. Therefore, any subsequent proposals calling for modification to the harbor which will affect the marine organisms or their habitats will require careful evaluation so that these organisms can be maintained.

If modifications to the current transportation system within the port are undertaken, a variety of models to predict the abundance and distribution patterns of the marine biota is available. These models

allow the response to each projected modification in the ports' design (i.e. dredge or fill projects) to be evaluated (Soule, 1976). The models bring to light many critical factors (i.e., current patterns, resuspension of toxic substances, reduction of DO, BOD, CO₂) which can adversely modify the ecology of the harbor as a result of any change in the existing systems.

However, many of the negative impacts can probably be mitigated, eliminated or even enhanced by careful planning and design of water corridors, wave dynamics effects, anti-pollution measures and non-disturbance measures, thus maximizing, as far as possible, a continuum of the present biological communities existing in the San Pedro Harbor area.

3. Geology

The existing geologic environment in the ports area is not expected to experience significant degradation due to the proposed transportation plan. Geologic impacts will be limited to an increased erosion potential and topographic modification, as indicated on the matrix.

a. Railways

Geologic impacts that will result from implementation of the proposed transportation plan are topographic modification and the potential for increased erosion during the construction of new facilities.

b. Waterways and Flood-control Channels

This mode of transportation proposes use of various types of water craft. These may create topographic modification of the sea floor bottom and adjacent land surfaces by producing additional wave activity--a seiche--in the waterways and control channels. In addition, the construction of landing facilities may modify the shoreline or channel banks.

c. Highways

Construction activities for additional and improved highways will increase the potential for erosion during their construction but will have minimal impacts. No other geologic hazards are expected to result from the expansion of existing highways and construction of new highways, since the majority of proposed transportation routes follow existing routes.

d. Aviation

The use of existing aviation facilities will prevent any significant impacts in the existing environment.

e. Pipelines

Construction activities for additional pipelines will increase the potential for erosion during their construction.

4. Noise

a. Railways

Since most of the existing classification yards will be closed down, railroad operations will virtually cease in these areas, thus enhancing the existing noise environment in this immediate area. Most future rail classification will be conducted at the new yard, and this may have an adverse impact on the residential area immediately to the east of the proposed location. Rail operations can be especially noisy, particularly if night work is performed when ambient noise levels are at a reduced value. It may be necessary to construct sound-absorbing barriers or additional landscaping as a mitigation measure. When the expected noise levels to be generated by operations at the new yard have been developed, it will be possible to determine whether any specific mitigation measures are necessary. It may be possible to institute these measures so that the noise levels in the adjacent areas conform to the local noise ordinance.

None of the various options that have been proposed for the rail system exhibits any significant improvement or degradation of the noise environment, with the notable exception of railroad operations that will be diverted below ground level, either in tunnels or in cuts. These measures will reduce the noise levels in the immediate area.

The overall effect of the railroad plan must be construed as a slight improvement of the existing noise levels in the ports area.

b. Transit

The net result of the transit plan will be a decrease in the number of automobiles and an increase in the number of buses on the streets and freeways in the area. A single bus is somewhat noisier than a single automobile; however, each bus will replace several automobiles and this will be particularly relevant during peak traffic periods. The resultant effect will be a net decrease in the ambient noise levels and a slight enhancement of the environment.

c. Highways

Vehicular traffic contributes significantly to the noise levels within the San Pedro Harbor area, and it is the dominating source within the area surrounding the ports. The proposed highway plan calls for the construction of new freeways, the expansion of some existing freeways,

and a general improvement in the traffic circulation patterns. The effects of these changes cannot be quantified at this time and a full evaluation of the noise impacts cannot be made until the projected peak and average traffic volumes on the individual streets and freeways have been determined. It is, however, expected that the proposed development of the freeway system will generate additional traffic on the freeways, while, at the same time, traffic will be attracted from the surface streets to the freeways. The net result should be a small improvement of the noise environment throughout most of the communities, but a slight degradation would be anticipated in the vicinity of the freeways. If necessary, noise-attenuating barriers or additional landscaping could be located adjacent the freeways in order to reduce the noise impacts to acceptable levels.

It should be noted that all the other transportation systems that are being developed will result in less vehicular traffic and consequently less noise throughout most of the study area.

d. Flood-Control Channels

The transportation plan proposes to use the Dominguez Channel and the Los Angeles River for transport of goods and people by barges and air-cushion vehicles. Initially, usage will be restricted to the region downstream of the new classification yard, but eventually this may be extended to downtown Los Angeles and Los Angeles Airport. The proposed users of the flood-control channels are all potentially noisy, but they should not have a particularly adverse effect on noise levels during the initial development stage. Most of the land adjacent to the Dominguez Channel between the proposed classification yard and the ports is devoted to industrial uses, apart from the residential area immediately to the west of the Los Angeles Harbor in San Pedro. The amount of the noise impact would depend on the types of sources involved and the activity levels of each type, but this information is not available at the present time. Should mitigation measures be necessary, it would not be possible to construct noise-attenuating barriers along the entire channel. The only choices available would be to reduce the noise being generated or to provide soundproofing to the residences and other affected property. The latter alternative could prove to be particularly expensive.

Other noise-sensitive areas--recreational, educational and residential--that are located adjacent the Dominguez Channel and the Los Angeles River north of the proposed classification yard would be impacted. Nighttime operations may present a noise problem to the residents living in San Pedro and to other communities located north of the new classification yard.

e. Aviation

The only development that would have an impact on the ambient noise levels would be the possible reactivation of Reeves Field or the

construction of new airfields. Any expansion of aviation operations in the San Pedro ports area must be regarded as a degradation of the noise environment, which would be impacted not only by aircraft operations but also by vehicular traffic generated by the airfield and by ground-based servicing operations. The Least Terns are presently using Reeves Field as a nesting area, and the noise generated by the proposed reactivation may possibly interfere with their nesting habits. There also exists the possible noise problem from seaplane activity.

Possible mitigation measures that could be adopted might include the exclusion of jet aircraft, the preclusion of nighttime operations, and the restriction of takeoff and approach patterns to areas that would not be sensitive to aircraft noise.

f. Construction

Construction equipment can be particularly noisy; for example, jack-hammers and earth-moving tractors can be associated with noise levels of up to about 95 dBA at a distance of 50 feet. Therefore, some inconvenience and annoyance during the construction phase may be unavoidable. Construction activities, however, will have to conform to the applicable noise ordinances.

g. Transportation Plan

At the present time there is very little specific data available with which to make detailed evaluations of the various elements of the transportation plan. It is recommended that a baseline noise study of the area be performed. Particular attention should be paid to areas where potentially adverse impacts might be expected, such as the area surrounding the proposed new classification yard, the Reeves Field area, the areas immediately adjacent to the flood-control channel and the sites for the new freeways. Operational data for the freeways, Reeves Field, the transit system and the flood-control channels will be determined as part of the engineering design. It will be possible to determine the impact on the noise environment once the operating data has been defined.

5. Water

The physical, chemical, and biological quality of waters in the San Pedro Ports would be affected by any construction. This is especially important when alteration (or expansion) of railways and highways is concerned. The water quality of the inner harbors area has improved because of good management practices, thus enhancing the growth of planktonic life. This practice should continue in order to maintain the present quality of port water.

a. Railways

During the construction phase, a short-term impact of this mode is expected on both fresh and marine waters by changes in pH, D.O. and turbidity. In addition water quality would be affected, which would be shown via elevated levels of toxic trace metals. During actual operations, regular maintenance or potential accidents of the railways would result in increased levels of toxic trace metals and organics being introduced via surface runoff into both fresh and marine waters. This would also apply to the potential effect on groundwaters via percolation of contaminants through the soil. It is expected that spills will not have significant impact, provided immediate proper attention is given in the event of an accident.

As provided in Section 11(b)(2) of the Federal Water Pollution Control Act (FWPCA), no person shall discharge or cause or permit to be discharged into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone, any oil (petroleum hydrocarbons) in harmful quantities as determined in 40 CFR 110, except as the same may be permitted in the contiguous zone under Article IV of the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended.

In furtherance of the provisions of FWPCA, the Environmental Protection Agency (EPA) has promulgated procedures, methods and other requirements for equipment to prevent the discharge of oil from both non-transportation and transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines.

b. Transit

This mode of transportation would actually have no long-term impact on the water categories, barring any accidents or spillages. However, should an accidental spill (of petroleum hydrocarbons) occur, this would undoubtedly have an effect on both fresh and marine waters via surface runoff. Thus, the quality of these two water environments in terms of trace contaminants would be affected. The physical oceanography of the marine waters would also be affected in that case. In addition, navigational safety cannot be underemphasized in the case of the shuttle and feeder links (water taxi/ferry) which are planned for use in the year 2000.

c. Waterways

The planned utilization of waterways, which would include movement of both cargo and personnel within the San Pedro Ports and along the coast of southern California, would introduce potential problems. These would primarily center around potential accidental incidents involving a hydrofoil, air-cushion vehicle (ACV) or surface-effect ship (SES),

and would result in spillage of petroleum hydrocarbons into waterways, creating significant impact. The result would involve a change in water quality, specifically trace organics, which would concentrate both on the surface and bottom sediment. Elevated levels of trace metals could also be expected. Given that the waterways (flood-control channels) drain into the San Pedro Harbor, this would be reflected in the marine waters as well. The wave action produced by ACV and SES vehicles could possibly introduce resuspension of sediments (silts & clays) in shallow waters, thus affecting a whole array of physico-chemical parameters.

A problem related to navigational safety may develop. It is expected that the volume of flow of ACV's, SES's, etc., will be such that accidents could occur. A control center should be established to monitor the flow of traffic, in terms of utilization of routes, frequency, etc., and to minimize the possibility of accidents.

The air-cushion vehicle (ACV), surface-effect ships (SES) and hydro-foils which would regularly traverse the San Pedro Ports area would also create potential accidents/spills. Specific measures to contain these spills will be necessary to mitigate the effects.

d. Highways

The major potential impact of highways would result from accidents. Accidents that would involve spillage of petroleum hydrocarbons or any liquid cargo would induce water quality degradation via surface runoff or through storm drains. The parameter indicators of a change in water quality would be the trace contaminants, either metals or organics. However, their impact would not be significant with quick response to counteract the results of the accident.

In addition, short-term impacts on the same category and their associated elements could be expected during construction or alteration of existing highway routes.

e. Flood-control Channels

Modification of flood control channels to facilitate access and increased use will necessitate major construction which could result in increased suspended sediment load. This could find its way into the marine environment and would affect the physical oceanography of the San Pedro ports.

Other than impacts associated with construction, the same general effects defined for waterways would be expected for any development of cargo and personnel transportation in the flood-control channels, once use is established.

f. Aviation

This transportation mode is expected to potentially impact both fresh and marine waters only in terms of surface runoff, which would eventually end up in these two environmental categories. However, this impact is considered insignificant. It would be picked up in the form of increased suspended solid loads of the nearby waters, which would not be of long duration. It is assumed that technology in the year 2000 will consist of refueling equipment designed to eliminate spills during fuel transfer.

g. Pipeline

Barring accidental spills, no impacts would be associated with this proposed plan. The potential impacts anticipated would primarily originate from possible leakages or ruptures that could occur along the various pipeline routes, valves and fill connections. The effects of a possible leak would be felt in both fresh and marine waters in the form of increased levels of trace contaminants, primarily petroleum hydrocarbons with their associated levels of trace metals.

6. Aesthetics

The aesthetic nature of the port will not be significantly altered by the proposed plans, since the area is considered "not scenic" by aesthetic standards. Expansion is expected to enhance the overall attractiveness of the port for people who appreciate such views.

7. Cultural Resources

None of the known archaeological, paleontological and historic sites within the harbor area will be affected by implementation of the proposed transportation plan. There is, however, a possibility that unknown sites, isolated artifacts or hidden fossil groups could be destroyed by implementation of various components of the plan.

8. Socioeconomics

Impacts on the socioeconomic environment by the proposed transportation plan for the San Pedro ports will be local, regional and national in nature, affecting the communities surrounding the ports in Southern California and in the extended market area throughout the United States.

a. Railways

One potential negative impact resulting from the modernized rail system could center around the fixed 37-foot clearance over the Cerritos Channel at the Badger Avenue (Henry Ford) Bridge. The Coast Guard is responsible for directing water traffic throughout the ports during

local or national emergency. During emergency operations, the Cerritos Channel may be needed by the Coast Guard as an alternate route through the harbor area. If the existing drawbridge is replaced with a fixed structure at 37-foot clearance, it may present a problem, as some vessels could have masts and radar antennae in excess of 37 feet.

While the Coast Guard may be unfavorably affected by the fixed bridge height, police and fire boats using the channel during emergency operations should have no trouble. Radar antennae on these boats are under 37 feet (personal communication; Gene Rodomski, Police Department; Captain Springer, Fireboat Station #49).

The upgraded Badger Avenue Bridge would also serve as a new utilities corridor carrying gas, electricity, water, phone and pipelines required by future development on Terminal Island and Terminal Island landfill.

Construction-related employment resulting from modernizing the rail system will increase temporary employment in the area, but over the long term, employment generated by the railroad is not envisioned to increase significantly.

b. Transit

Future growth of port activity is expected to increasingly aggravate the peak-hour congestion at several locations along the existing road network. The proposed transit element for the ports should relieve the road network overburden. This will have a positive impact on port-related employment. While the transit modes have not been analyzed pending further development of requirements, several systems have been identified that will improve circulation. These include:

Minibus on existing streets

Group Rapid Transit (GRT) (i.e., small vehicles on dedicated guideways)

Personal Rapid Transit (PRT) (i.e., individual vehicles on dedicated guideway, on demand, direct origin to destination)

Para-transit (i.e., any form of shared facility such as taxis, jitneys, dial-a-bus, etc.)

Shuttle and feeder links (taking the form of minibus, tram, small vehicle on guideway, and/or aerial ropeway, water taxi, water ferry, etc.)

CALTRANS bus on freeway.

It has also been suggested that port businesses provide remote parking facilities outside the port area with private shuttle buses to transport employees to and from the ports. Implementation of some or all of these transit systems is expected to improve the workday circulation, reduce traffic volume, and improve local parking conditions. Each of these improvements would benefit employee movement throughout the ports. Transit-related employment, however, is not expected to increase significantly.

c. Waterways

Utilizing the existing waterways radiating from the ports as transportation corridors is expected to increase the overall efficiency, organization and safety of water-borne traffic. This, of course, will have a positive impact on marina facilities located in the outer harbor waters. It is possible, however, that marina facilities presently located near the Consolidated Slip in the East Basin could be eliminated should the barge lumber yard be built in conjunction with the classification yard. It has been estimated that approximately 1000 small craft berths are located along the main shipping channels (pers. comm., Lemike). On a typical weekday, approximately 850 small craft movements per day (including visitor as well as craft from the combined Los Angeles and Long Beach marinas) remain inside the harbor breakwaters (Draft EIR Vol 2, Port of Long Beach). Pleasure boats using the same water lanes as barge and other commercial traffic may represent a major conflict of water use, having regard to the anticipated increase in traffic envisioned in the transportation plan by the year 2000. This condition could present safety problems. As this conflict could cause hazardous boating conditions, it must be considered a negative impact. Relocation of the inner harbor marinas to the proposed 950-slip Cabrillo Marina offers a possibility for relocation of the displaced marina facilities away from the strictly commercial operations.

d. Highways

Implementation of the highway plans will improve vehicular circulation, decrease congestion at certain intersections, and upgrade traffic control. As a result, the roadnet system surrounding the ports should handle peak-hour traffic more efficiently. As vehicular circulation is improved, there will be less congestion at bottleneck intersections, fewer fumes, and less noise, which will enhance travel conditions. Adverse social effects resulting from congested highways--time loss, personal frustration, etc.--will be decreased. The improved roadnet will enable cargo to be transported more rapidly, economically and efficiently. There should also be savings in energy use from the improved roadnet system. An improved roadnet may make underutilized or vacant parcels more attractive for the location of new businesses. Potentially, this could enhance land use in the ports area.

e. Flood-control Channels

Recreational uses may be included in the flood-control channels. A workable scheme might include sailing, skiing and swimming in certain designated locations, subject to the construction of dams--provided these dams are in line with flood-control objectives to insure adequate water levels.

Flood-control channels represent underutilized rights-of-way. Their adaptation could replace other modes of transportation, consequently releasing valuable port property and traffic arteries for other purposes. If certain engineering and environmental concerns can be resolved, joint use of the channels for flood control and for commerce purposes is expected to benefit the economic environment of southern California. Use of the existing channels for commercial activity will represent an improved use of dormant resource.

f. Aviation

As general aviation airports in the Los Angeles Basin have reached capacity, reactivation of Reeves Field in the port area or the construction of a new civilian airport in San Pedro (recommended by the FAA National Airport System Plan) would increase opportunities for private recreational flying.

An increase in general and commercial (Catalina Airlines) aviation activity in the harbor area could conflict with marina recreation. Additional airplane traffic could mean increased nuisance from noise and fumes. It could also mean a higher risk of accident, raising the issue of public health and safety.

An increase in general and commercial aviation activity could cause a modest increase in the economy of the area. Air traffic to Catalina Island is presently at 75,000 passengers per year and is expected to continue rising. Commercial air freight operations, together with increased general aviation activity, will also have a beneficial impact on the local economy.

An increase in general and commercial aviation activity may generate a modest increase in employment opportunities. Catalina Airlines is planning to increase its fleet of seaplanes, thus providing a number of new jobs. Reactivation of Reeves Field or construction of a new field in San Pedro will also mean additional jobs. The new airport could attract air freight operations serving businesses located in the ports. This would also mean additional employment opportunities.

g. Pipeline

The major effect that the pipeline plan will have is the consolidation of pipeline rights of way into defined corridors. This will facilitate

future planning activities, especially with regard to new port facilities. In addition, constraints to construction of new transportation facilities caused by the existing heterogeneous alignment of pipelines will be reduced.

h. Transportation Plan

Implementation of the overall plans will have a positive impact on national defense. By upgrading and modernizing each transportation element for more efficient operation, people and cargo can be moved more rapidly and effectively during emergency operations than is presently possible.

There will be minor effects on the following public service safety systems: police, fire, public works, building inspection, other permit and regulatory activities, flood control and storm drains. These will largely be in manpower costs mainly for inspection purposes.

The following public health services will be affected: emergency medical care, health care, sanitary-sewer system and solid-waste management. The effects include increased staffing, additional flows to the Sanitation District's sewer lines, and additional waste for local sanitary land fills (which currently are near capacity).

Impacts on community services will occur as a result of project implementation. A number of new jobs will be created by the overall plan. Some of these jobs will be filled by persons moving into the region from other areas. New residents will generate some additional demand on existing community services such as libraries, parks and schools.

Owing to the present commuting patterns within Southern California, however, new residents will most likely be distributed throughout the Los Angeles metropolitan region. The demand on services generated by these people will be spread among several communities and will not result in a significant impact in any individual community. The project may, in fact, reduce the demand on community services such as welfare, as new jobs may be filled by those already on public assistance.

Implementation of the proposed transportation plan will result in an increase in public revenues, employment and population in the communities surrounding the ports. Increases will come about as a result of temporary changes during construction efforts (construction crews) as well as permanent changes resulting from expanded port operations.

Implementation of the transportation plan will lead to modest increases in both direct and indirect employment. While projection of future employment from the proposed developments is difficult to

forecast, it is apparent that employment opportunities in the commercial, general cargo, recreation and shipyards categories will undoubtedly increase slightly owing to the intensity and land use changes foreseen in the transportation plan.

The overall plan is not likely to increase employment figures for the fishing industry or the commercial shipyards and boatworks, the two largest employers in the area (presently accounting for over 2/3 of the total employment in the Los Angeles Port). A 50% increase in the population of the Naval Facilities is anticipated by 1984, and permanent population will increase modestly as a result of the overall transportation plan. Based on present best estimates, it is projected that new residents moving into the area could increase population approximately three to four percent.

A net fiscal increase will result after subtracting additional municipal costs and the ports' construction bond payments from gross income.

The transportation plan itself envisages changes in land use for optimum utilization of alternatives. As the combined container distribution center in the vicinity of the classification yard north of the harbor area is developed, certain waterfront land presently occupied by container storage will be released for other ocean-oriented facilities. In addition, the land use would be altered by reappropriating the space vacated by the flat rail yards in the ports area and transferring operations to the central classification yard. In the existing land-scarce situation, the optimal land uses to be made of the vacated areas should be the subject of an early study, and a land use management plan should be set forth accordingly. The transportation plan will influence existing land use and will require appropriate land use management to ensure reappropriation that will enhance present conditions.

With increased cargo projections and the consequential greater transportation facilities required, some of the lands now occupied will necessitate reorganization, depending on transportation usage. Additional fuel-storage areas may be required if the pipelines are not developed to their optimum. Conversely, if a pipeline plan is developed to take crude oil and products away from the port area, then the amount of storage required in the port area may be reduced accordingly, thereby creating additional available land.

The transportation plan will have a positive impact on utilization of existing and future land. However, because of highway use by trucks, transit for people, and other modes of transportation, additional fueling facilities will be required in the long term, necessitating a rearrangement of land uses. Where appropriate, certain land uses should be planned according to the anticipated needs of the upgraded and modernized transportation arrangements.

It is anticipated that because of the improved transportation network to handle the additional cargo throughput, a larger work force will be employed in the port areas. Consequently, parking requirements will be greater, and particular areas will have to be devoted to this purpose, as existing parking arrangements within the port areas are inadequate. To handle the existing overload of parking, many roads and other vacant lots are being occupied. The parking question is closely related to land use, but it is hoped that this will be mitigated to some extent by use of peripheral parking in areas which are not required for port use by providing improved transit between them and job-related areas.

C. Summary

The purpose of the summary matrix, Figure 32, is to show the expected environmental areas of concern relative to the modal alternatives considered. Identification of these environmental areas indicates the relative importance to be placed on further analysis. This summary was based on a review of the impacts developed in the environmental assessment matrix. The weighting factors were based on a qualitative analysis and review of the material previously presented, and is as follows:

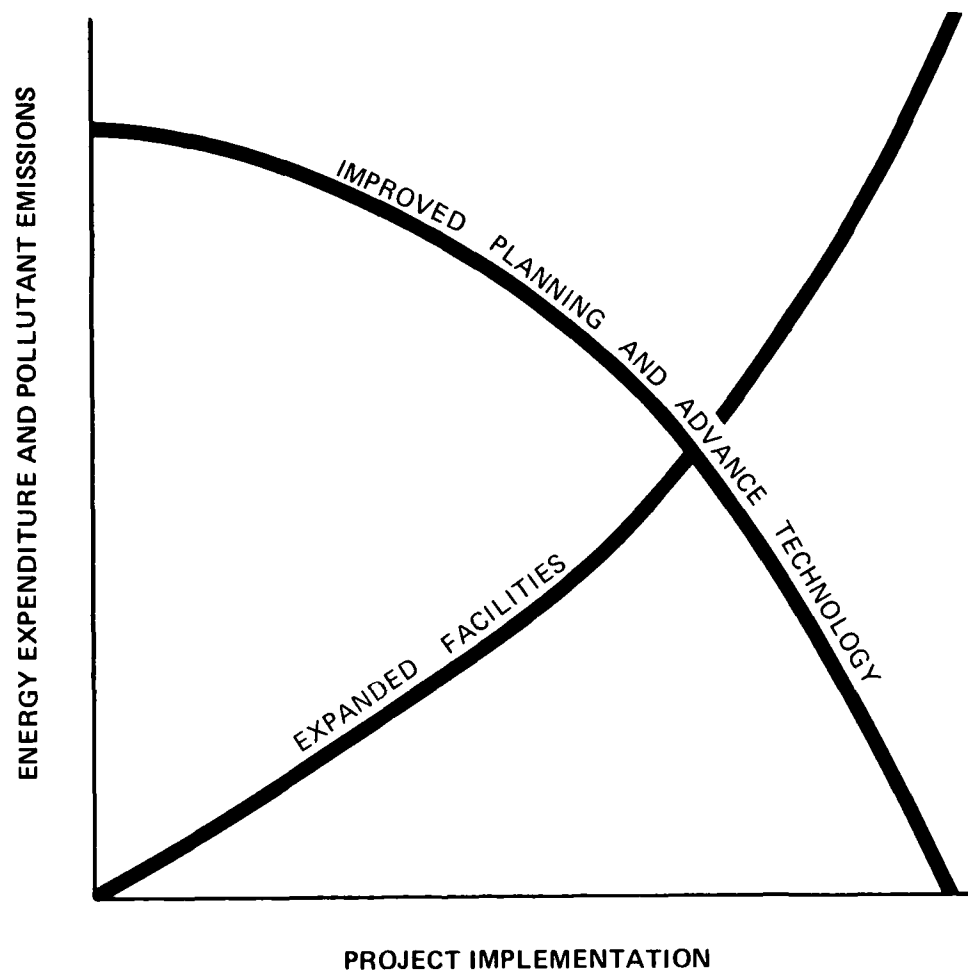
- +2 = Significant Enhancement
- +1 = Minor Enhancement
- 0 = None
- 1 = Minor Degradation
- 2 = Significant Degradation.

A minor degradation (-1) is evident in only two of the environmental elements, biology and water. Although there are individual variations in others, on balance air and noise could be considered to have no impact (0). Aesthetic, cultural and services categories show no impact (0) across most elements. The socioeconomic element is expected to show minor enhancement (+1)..

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* THE TRANSPORTATION PLAN CATEGORY INDICATES IMPACTS CAUSED BY IMPLEMENTATION OF THE PLAN AS A WHOLE, AND NOT ATTRIBUTABLE TO ANY INDIVIDUAL PLAN COMPONENT.



ELEMENTS AFFECTING NET IMPACTS

Source: VTN Estimates, 1978

FIGURE 31

MODE ENV. ELEMENTS	RAILWAYS	TRANSIT	WATERWAYS	HIGHWAY	FLOOD CONTROL	AVIATION	PIPELINE	TRANSPORTATION PLAN
AIR	+2	+2	0	+1	0	-1	0	+1
BIOLOGY	-1	0	-1	-1	-1	-1	-1	-1
NOISE	+1	+1	+1	0	-1	-2	0	+1
WATER	-1	-1	-1	-1	-1	0	-1	0
AESTHETIC	0	0	0	-1	0	0	0	+1
CULTURAL	0	0	0	0	0	0	0	0
SERVICE	0	0	0	0	0	0	0	0
SOCIOECONOMIC	0	0	+1	+1	0	0	0	+1

Note: Geology impacts short term only

+2 Significant Enhancement
+1 Minor Enhancement
0 None
-1 Minor Degradation
-2 Significant Degradation

Air: SO_x
Particulates
NO_x
HC_x

Biology: Vegetation
Plankton
Benthos
Mammals
Fisheries

Marine

Avifauna
Wildlife
Vegetation
Wildlife
Vegetation

Fresh Water
Terrestrial

Noise: Residential
Recreation
Commercial/Industrial

Water: Navigational Safety
Wastewater Discharges
Surface Runoff
Spills

Fresh Water

Water Quality
Wastewater Discharges
Surface Runoff
Spills

Marine

ENVIRONMENTAL EVALUATION SUMMARY

FIGURE 32

CHAPTER V

ECONOMICS

Purpose

The purpose of the economic analysis of the San Pedro ports transportation plan is to determine impacts of future port operations on the transportation networks servicing the ports. The analysis includes determination of additional costs incurred as a result of inadequacies in the existing transportation system, proposals for alternatives to help expedite movement of traffic, and an evaluation of benefits on the basis of decreased transportation costs and/or higher operating levels over the existing conditions.

Methodology

The estimation of economic gains to be accrued by any transportation proposals will include transport savings, reduction in travel time, and gains realized as a result of higher levels of throughput. The inter-relational effect of the various modes of transportation requires that any plan be evaluated considering the entire transportation network rather than a single mode analysis. The process of evaluating the transportation system is outlined as follows:

- o Determine existing use levels of each transportation link
- o Determine the capacity of each system operating at an acceptable service level
- o Develop future use levels of each system without increased port activities
- Identify future potential traffic generation as a result of port expansion activities
- Assign increased traffic to each specific route and mode
- Determine potential for increased traffic levels and effects on circulation of each mode
- o Compare operating levels and delay/congestion with and without the plan
- Use operating and delay costs for each mode and trip type to determine cumulative transportation benefits.

This analysis of the transportation network includes an evaluation of each mode. An assessment of the overall system follows together with an estimate of the effectiveness of the present facilities over time. A regional assessment of the transportation network and the problems associated with increased traffic from the ports is then presented, along with information on operating costs for rail and truck movements.

At the end of this chapter is a partial list of data needed to complete the economic analysis.

RAILROAD OPERATIONS

Inventory of Rail Facilities

Trackage, Railroad Yards and Loading Facilities

The two tables following this page present the track miles in the two ports, and loading facilities with their capacities in the Port of Los Angeles, respectively.

Nearly 50 percent of the yard capacity is located in the Pier A Classification Yard (1,041 cars), which is the primary arrival-departure point for the Port of Los Angeles. The Brighton Beach Yard, located adjacent to Ocean Avenue on Terminal Island, serves as a secondary classification and transfer point, and has a holding capacity of 572 cars. The San Pedro Yard provides holding and classification facilities for southwestern area docks and services, principally for the GATX tank car terminal. The remaining 3 yards provide intermediate classification, transfer and storage facilities for 463 cars.

The Port of Los Angeles bulk loader is located directly south of Waterhorn Basin and has a loading capacity of 2,000 tons per hour. The Los Angeles Grain Terminal, located on Terminal Island, has an approximate loading capacity of 1,000 tons per hour. In addition, there are 5 gantry cranes located in various parts of the port.

A third table shows that there are 8 railroad yards in the Port of Long Beach with a total capacity of 1,535 cars. The Eighth Street classification yard located near the upper Cerritos Channel, is the major classification point for regional and national arrivals and departures. Both Santa Fe's Watson Yard and Union Pacific's Mead Yard are partially used for Port traffic and, combined, can handle 741 cars. According to Long Beach Port authorities, the Pier G Bulk Loader has a rated capacity of approximately 4,000 tons per hour.

Rail Cargo Movements

The 3 railroads which serve the San Pedro ports do not compile cargo tonnage statistics for anything less than regional districts. As a consequence, it is not possible to develop direct data to illustrate the percentage of tonnage handled by rail vis-a-vis truck transport and pipe shipments. However, both port switching systems maintain records related to the total number of inward and outward loaded freight car shipments. This data is used as the primary basis for rail tonnage estimates and modal distributions.

A summary of freight car shipments is presented in the following table for the Ports of Los Angeles and Long Beach for the period between 1969 and 1977. Rail movements in the Port of Long Beach have decreased relatively greater than those in the Port of Los Angeles. Total freight car movements over the 9 year period have diminished to approximately 50 percent of the 1969 volume.

MILES OF TRACK IN
LOS ANGELES AND LONG BEACH PORTS

<u>Organization</u>	<u>Los Angeles</u>	<u>Long Beach</u>	<u>Total Area</u>
Southern Pacific Railroad	29.50	42.00	71.50
Union Pacific Railroad	13.72	18.00	31.72
Santa Fe Railroad	0.75	--	0.75
Harbor Belt Line Railroad ¹	<u>64.45</u>	<u>--</u>	<u>64.75</u>
Total	108.42	60.00	168.42

¹ Combined operation of Southern Pacific, Union Pacific, Santa Fe and the City of Los Angeles

Sources: Port of Los Angeles Master Plan
Port of Long Beach Master Plan
Harbor Belt Line Railroad
Southern Pacific Transportation Company

PORT OF LOS ANGELES
RAIL LOADING FACILITIES AND CAPACITIES
(1974-1978 Data Base)

<u>Facility</u>	<u>Responsible Organization</u>	<u>Capacity</u>
RAILROAD YARDS --		
1. San Pedro Yard	Harbor Belt Line	177 cars
2. Pier A Yard	Harbor Belt Line	1,040 cars
3. Union Pacific Transfer Yard	Union Pacific	transfer only
4. Brighton Beach Yard	Harbor Belt Line-Union Pacific	527 cars
5. Wilmington West Yard	Harbor Belt Line	194 cars
6. McFarland Yard	Harbor Belt Line-City of Los Angeles	<u>269 cars</u>
Total Capacity		2,208 cars
LOADING FACILITIES --		
1. Bulk Loader (Watchorn Basin Area)	City of Los Angeles	160 cars
2. Los Angeles Grain Terminal	City of Los Angeles	120 cars
3. (5) Gantry Cranes	N/A	N/A

Source: Port of Los Angeles

PORT OF LONG BEACH
RAIL LOADING FACILITIES AND CAPACITIES
(1975 Data Base)

<u>Facility</u>	<u>Responsible Organization</u>	<u>Capacity</u>
RAILROAD YARDS --		
1. Eighth Street Classification Yard	Southern Pacific	390 cars
2. Seventh Street Peninsula Yard	Southern Pacific	52 cars
3. Dolores Yard	Southern Pacific	temp. storage
4. Watson Yard	Santa Fe	336 cars
5. Mead Yard (outside immediate area)	Union Pacific	405 cars
6. Seaside Classification Yard	City of Long Beach	84 cars
7. Pier A Classification Yard	City of Long Beach	220 cars
8. Pier J Classification Yard	City of Long Beach	<u>48 cars</u>
Total Capacity		1,535 cars
LOADING FACILITIES --		
1. Pier A Grain Terminal	City of Long Beach	70 cars
2. Pier D Gantry Crane	City of Long Beach	55 cars
3. Pier G Bulk Loader	City of Long Beach	<u>285 cars</u>
Total Capacity		410 cars

Source: Port of Los Angeles

To gain an understanding of the railroads' relative importance to total San Pedro ports' shipping, an estimate of average tonnage per car was made and then multiplied by the total number of car movements. The average tonnage per car figure was set at 55.7 tons, based upon a combination of national freight car statistics and unit train car load averages. The results of this process, along with total tonnage shipments, are presented in the table following this page. Based upon the data presented, plus additional information related to pipeline shipments, a modal distribution of goods movements was developed.

Pipeline shipments -- primarily oil -- accounted for 73 percent of tonnage shipped to and from the San Pedro ports. Rail shipments accounted for 4 percent of total goods movement, while truck transportation was responsible for 23 percent. Assumptions used in developing this modal split are:

1. All liquid bulk cargoes are handled by pipelines.
2. Rail capacity is computed using an average load per car times number of loaded car movements.
3. Truck tonnages are assessed as computing the total.

Liquid bulk cargoes present a particular problem in developing a modal split. These commodities can be handled by pipeline, railroad tank cars or truck tankers, but a breakdown of transport modes for liquid bulk is not readily available. Also several movements of these cargoes within the primary study area before leaving the harbor area makes net commodity movements difficult to calculate. As an example, crude petroleum offloaded to storage tanks, to a local refinery and back to a tank farm, finally to be distributed as a final product involves several movements and possibly several different modes, all within the study area. The assumption that all liquid bulk is handled by pipe presents an optimal utilization of the existing networks, as pipelines display a capacity for all anticipated flows, while rail and highway networks will be overtaxed with future commodity flows.

Rail System Capacity Analysis

System capacity is typically defined as the total amount of cargo which may efficiently be transported by the selected mode. However, for rail transportation within the San Pedro ports, system capacity is a much more tenuous issue, especially since present utilization appears to be at a very low level. Officials of the switching systems are of the opinion that the railroads could handle a much greater volume of traffic than presently experienced. They stated that, during World War II, the systems each handled approximately 150,000 loaded freight car movements, and that level of utilization could, in their view, be achieved again if the need arose. They further indicated that the World War II movements approached maximum capacity for the system. This level of utilization (300,000 cars per year) is approximately 6 times greater than present use.

NUMBER OF LOADED CAR MOVEMENTS
PORTS OF LOS ANGELES AND LONG BEACH
(1969-1977)

<u>Year</u>	<u>Port of Los Angeles¹</u>	<u>Port of Long Beach²</u>	<u>Total, Both Ports</u>
1969	41,132	56,404	97,536
1970	35,831	52,801	88,632
1971	29,399	49,377	78,776
1972	33,185	19,307	52,552
1973	40,889	20,657	61,546
1974	34,809	25,319	60,128
1975	33,932	27,649	61,581
1976	29,488	19,332	48,820
1977	30,135	19,438	49,573

¹ Movements by Harbor Belt Line R.R.--figures do not include Union Pacific-Mead Yard movements.

² Movements by Southern Pacific R.R.

Sources: Southern Pacific R.R.
Harbor Belt Line R.R.
VTN Consolidated, Inc.

PERCENTAGE OF TOTAL FREIGHT TONNAGE
HANDLED VIA RAIL TRANSPORT

<u>Year</u>	<u>Total Shipments (Tonnage)</u>	<u>Total¹ Rail Handled Tonnage</u>	<u>Percentage Handled Via Rail Transport</u>
1969	42,766,903	5,432,700	13 percent
1970	44,865,218	4,936,800	11 percent
1971	44,188,516	4,387,800	10 percent
1972	44,631,740	2,927,100	7 percent
1973	53,110,513	3,428,100	6 percent
1974	52,813,124	3,349,100	6 percent
1975	57,333,496	3,340,100	6 percent
1976	62,388,585	2,719,300	4 percent

¹ Based upon average freight tonnage of 55.7 tons per car, to include unit trains, flat and box cars.

Sources: VTN Consolidated, Inc.
Harbor Belt Line R.R.
Port of Long Beach
The Natelson Company, Inc.

The above considerations make judgment of the proposed rail transport plan extremely difficult from an economical point of view. In the best case, it would be desirable to compare existing system capacity with movement estimates of the newly proposed rail plan and draw conclusions based upon comparative tonnage capacity.

To gain quantitative appreciation of the rail system, the following two tables have been prepared which illustrate the future (1976-2020) required capacities of the extant rail system versus the newly proposed plan. Assumptions that were utilized in the preparation of the tables are as follows:

- All liquid bulk could be accommodated by pipe transport leaving residual tonnage to be shipped by rail or truck.
- For the existing internal rail system a total of 300,000 car movements per year could be accomplished at maximum capacity.
- Based upon estimates provided by VTN Consolidated, Inc., a total of 150,000 car movements could be made under the new plan.
- The average freight car would accommodate 60 tons of cargo (which represents a conservative growth trend from the current estimate of 55.7 tons).
- For truck transport, it was assumed that the 1976 tonnage estimate would provide the basis for residual new tonnage to be handled by rail or truck.

The first table illustrates the amount of new capacity required from either the truck or rail mode based upon the current rail system. As presented, new capacity will not be required until the 1990's. In contrast, the next table describes the case under the newly proposed rail plan and shows that new capacity will be required as early as 1980 since total car movement capacity will be significantly less than the present system.

From discussions with shipping agents and other port officials, it appears that the critical issue to rail utilization is delay time. Because of internal system delays (i.e., cars unavailable, bottlenecks to movement, switching delays, etc.), many shippers appear to have lost confidence in rail transport. Capacity utilization does not appear nearly as important to system use as management efficiency. Discussions with the railroad companies indicate that inter-modal rail-truck container hauling has significantly altered operations over the last few years. Specifically, ships off-load containers at the ports which are loaded onto "bogies" (flat bed trucks) and are moved north to the main classification yard at Los Angeles. This operation seriously affects the rail system's cargo tonnage estimates, and much of the supposed regional truck traffic could possibly be regional rail transfers; specific data on these movements are not available at this stage of the analysis. Despite this new operation, however, if trucks continue to be utilized for container traffic transfers, then it is possible that alternation of the San Pedro rail system will not materially improve rail utilization.

**PROJECTED LAND TRANSPORT (RAIL/TRUCK)
CAPACITY REQUIREMENTS (1976 – 2020)
(with existing rail system)**

	Year:			
	1976	1980	2000	2020
Total Port Freight Tonnage ¹	62,388,585	97,020,000	181,301,000	255,514,000
Tonnage Shipped by Pipe ²	45,658,573	72,097,000	110,241,000	144,629,000
Residual Tonnage ³	16,730,012	24,923,000	76,060,000	110,885,000
Port Rail Capacity ⁴	18,000,000	18,000,000	18,000,000	18,000,000
Deficit to be Shipped by Truck ⁵	-0-	6,923,000	58,060,000	92,885,000
1976 Truck Shipments ⁶ (minimal capacity level)	14,349,000	14,349,000	14,349,000	14,349,000
New Capacity Required ⁷	-0-	-0-	43,711,000	78,536,000

Source: The Natelson Company, Inc.

- 1 - Estimates by the U.S. Army Corps of Engineers for all cargo shipped through San Pedro Ports
- 2 - Estimates based upon liquid bulk movement
- 3 - The amount of tonnage remaining after subtraction of pipe tonnage from total tonnage
- 4 - Based upon estimates of 300,000 car movements, at average of 60 tons per car
- 5 - The tonnage that cannot be handled by rail
- 6 - Estimates based upon modal distribution data presented in the previous table
- 7 - The amount of new tonnage capacity required of either rail or truck transport

**PROJECTED LAND TRANSPORT (RAIL/TRUCK)
CAPACITY REQUIREMENTS (1976 – 2020)
(Proposed Rail System)**

	Year:			
	1976	1980	2000	2020
Total Tonnage	62,388,585	97,020,000	181,301,000	255,514,000
Tonnage Shipped by Pipe	45,658,573	72,097,000	119,241,000	144,629,000
Residual Tonnage	16,730,012	13,923,000	76,060,000	110,885,000
Port Rail Capacity ¹	9,000,000	9,000,000	9,000,000	9,000,000
Deficit to be Shipped by Truck	7,730,012	15,923,000	67,060,000	101,885,000
1976 Truck Shipments (minimal capacity level)	14,349,000	14,349,000	14,349,000	14,349,000
New Capacity Required	-0-	1,574,000	52,711,000	87,536,000

Source: The Natelson Company, Inc.

For all modes, the shippers' perception of relative modal efficiency or convenience, as well as direct empirical efficiencies determines modal choice. A change in system design may influence shippers' preference and impact modal distribution. For this reason, a revised rail system may increase rail utilization.

Pipelines

The system of oil, gas, and products pipelines in the vicinity of the San Pedro ports is shown in Figure 33. Most of the pipelines emanating from the ports area are used to handle crude and refined petroleum products. These pipes are owned by the oil companies themselves, and connect production fields and the labor petroleum terminals to refineries and the market distribution network. The majority of petroleum and petroleum products going through the ports is incoming. Offloading rates for the liquid bulk terminal at the ports total 364,000 barrels per hour. A breakdown of flowage rates by terminal follows:

<u>Port</u>	<u>Berths</u>	<u>Pipelines Number 1 Volume</u>	<u>Offloading Volume (Barrels/Hr.)</u>
L.B.	76-79	1-8", 1-12", 1-10", 3-14"	10,000
L.B.	118-119	1-14", 1-24"	10,000
L.B.	84-87	1-16", 1-24"	20,000
L.B.	73	1-6", 1-8"	2,000
L.A.	37-40	CLASSIFIED	5,000
L.A.	45-47	2-12", 1-30", 1-36"	40,000
L.A.	70-71	2-8"	4,000
L.A.	97-102	2-4", 4-6", 6-8", 3-10", 5-12"	9,000
L.A.	120	1-6", 2-8", 4-10"	10,000
L.A.	118-119	2-6", 4-12"	7,000
L.A.	148-151	2-4", 10-6", 6-8", 11-10", 10-12"	15,000
L.A.	163-164	7-6", 2-8", 2-10", 4-12"	38,000
L.A.	167-169	2-6", 2-8", 4-12"	15,000
L.A.	171-173	1-8", 1-10", 1-16"	25,000
L.A.	215	1-10", 2-8"	9,000
L.A.	216-217	2-6"	2,000
L.A.	237-240	3-6", 3-8", 2-10", 9-12"	18,000
L.B.	SOHIO (proposed)	3-48"	<u>125,000</u>
Total			364,000

Some of the pipeline offloading systems are limited by berth constraints. In effect, several offloading systems are tied to a single berth, and only one system is used to offload vessels at berth. Offloading capacity, taking into account berthing constraints, is 342,000 barrels per hour. If these pipes were fully utilized assuming a 50% berth occupancy rate, annual berth loading capacity is 225,000,000 short tons. Offloading times per vessel range from 20 hours to 200 hrs per vessel, depending on vessel capacity at berth and offloading rates.

Additional offloading capacity in Los Angeles County exists through 14 offshore marine terminals at El Segundo, with an offloading capacity of 38,000 barrels per hour. Assuming a 75% terminal occupancy rate, offloading capacity for the terminal is 37,500,000 short tons annually.

The oil refinery capacity in southern California is currently 1,105,000 barrels per day, with an additional 318,000 barrels per day capacity proposed.

Current oil production (1977) in Los Angeles County is 79,139,000 barrels annually, down from 104,400,000 barrels in 1973. Reserves were estimated at 950,7000,000 barrels in 1975. The future energy needs for Los Angeles and southern California clearly will be more dependent on imported oil and gas. A table showing projected oil and gas requirements for southern California follows:

CONSUMPTION OF OIL AND GAS IN CALIFORNIA
1960-1990
(Trillions of BTU)

	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>
OIL	1215.6	1746.6	3110.0	3865.0
GAS	<u>767.4</u>	<u>1269.4</u>	<u>1030.0</u>	<u>1250.0</u>
Total	1983.0	3016.0	4140.0	5115.0

Source: S. H. Clark Associates

Based on these estimates, demand for oil in southern California will be 83.5 million tons in 1980 and 103.8 million tons in 1990. This indicates a growth in oil and gas requirements for southern California of 2.4% annually between 1980 and 1990. The commodity flow projections for 1980, 2000 and 2020 for Los Angeles and Long Beach Harbor liquid bulk cargoes is given as follows:

Inflows by Short Tons (Imports and Coastwise Receipts)

<u>1973</u>	<u>1980</u>	<u>2000</u>	<u>2020</u>
25,485,000	65,040,000	104,432,000	139,363,000

Outflows by Short Tons - (Exports and Coastwise Shipments)

<u>1973</u>	<u>1980</u>	<u>2000</u>	<u>2020</u>
8,027,000	7,057,000	5,809,000	5,266,000

Inflow in short tons for crude petroleum and petroleum products is 64,148,000 tons in 1980, 101,814,000 tons in 2000 and 132,912,000 tons in 2020. Outflows in short tons for crude petroleum and petroleum products is expected to be 6,783,000 for 1980, 5,351,000 in 2000 and 4,635,000 in 2020.

Given these projections and assuming a 50% berth occupancy rate, offloading rates to handle the crude and petroleum products expected, using a 340 day operating year, would be 105,000 barrels/hour in 1980, 166,000 barrels/hour in 2000, and 217,000 barrels/hour in 2020. There does not appear to be a lack of offloading capacity in Los Angeles-Long Beach Harbor for petroleum products. Since over 95% of liquid bulk products going through the ports are petroleum and petroleum products, the initial offloading facilities to tanks at farms, refineries or main gas and oil transmission lines appear adequate. The figures for offloading capacity used are assuming the SOHIO proposal is operating.

The capacities of pipeline systems past the immediate offloading system at the ports will require an extensive analysis of flowage capacities, refinery capacities and future processing and distribution locations and needs as part of the proposed master plan for pipelines and pipeways. Additional petroleum traffic to eastern markets or processing centers may in the future require greater offloading and distribution facilities.

Highways

Existing Conditions. To evaluate the ability of the existing roadway network in and around the Los Angeles-Long Beach Harbor, it is fundamental to determine the exact capacity of each of the several freeways and major highways serving the ports. Estimated design capacity figures were obtained in the Port of Long Beach General Plan - 1973 for Long Beach, while estimated design capacity figures for the Los Angeles and Long Beach Harbor areas were obtained from the "Draft Environmental Impact Report, Proposed General Plan" printed by the Port of Long Beach. The latter volume was released in 1975. However, it must be stressed that the figures obtained from both of these documents are

only gross estimates. Each report has established different capacities for the same streets. This information was provided by the traffic departments of the cities of Los Angeles and Long Beach. The higher of the two capacity figures obtained for each highway or artery where a choice was available was used. Capacities designated to each major roadway can be seen in Figure 34. To depict the existing condition of the transportation network, peak hour volumes of traffic are also displayed in this figure. By comparing both the capacity and the present peak hour volume, it can be seen that there are several highway segments which are operating at levels greater than those for which they were designed. This translates into decreased operating speeds and increased time delays in the area.

Future Conditions. The harbors are the major traffic generators in the San Pedro, Wilmington and Long Beach areas. Therefore, to determine the ability of the road network to accommodate future traffic demands, it is necessary to determine the amount of cargo entering and exiting the ports by truck. The commodity flow study by the Corps of Engineers, South Pacific Division, was used for cargo projections for the years 1980, 200 and 2020. To determine how much of the cargo entering and exiting the ports were to be transported by truck, some basic assignments were made. All liquid bulk is assigned to the existing pipe network (including SOHIO). Of the remaining cargo projected for each year, 2,720,000 tons were assigned to rail. This is the present throughput of the railroads. While the physical capacity of the railroads to carry cargo to and from the ports is greater than 2,720,000 tons, they are restricted in their operations by social factors. As a result of community pressure, it is understood that railroads are allowed to run only approximately 2 trains per day through the rail corridor between the harbor and the classification yards located in downtown Los Angeles. Once cargo is assigned to both rail and pipe, the residual is assigned to truck transport for each projected year. Through the use of information provided by both the Ports of Los Angeles and Long Beach relating to increased capacities of throughput by specific areas within the ports, it was possible to assign the increases of projected cargo to these specific areas.

To determine the number of truck trips generated as a result of this increased cargo, the average truck load is assumed to be 16 tons. By dividing the assigned tons of cargo for each area by this figure, the number of truck trips per year per area can be calculated. The truck trips for the year 2000 represent the trips generated by area to handle additional cargo over 1980 levels. By the year 2000, most of the existing land capable of being used for ship and cargo handling will be utilized.

It is assumed all the increases in cargo capacity and therefore truck traffic in the year 2020 will be generated from land fill south of Terminal Island. Background traffic for this study is defined as traffic using the harbor area roadnet, but not generated from increased port operations.

Background traffic for 1980 was assumed to be equal to the figures present now for 1977. In the assignment of truck routes entering and exiting the specific Harbor areas, trucks are assumed to take the most probable route to reach the Interstate Freeway 405. Once a truck reaches 405, either by State Highway 4, 11, or 17, its direction is indeterminant. Trucks are assumed to operate on a 6 day work week. Since 1977, peak hours volume and capacity figures are given in terms of passenger vehicles, it is necessary to convert the number of trucks on the highway to an equivalent number of passenger vehicles before they can be added to the background traffic. A general rule of thumb provided by CALTRANS equates 1 truck to 2 passenger vehicles. Once the increased volume of traffic is determined as a result of the increase in truck movements and direction is assigned, it is assumed that 1/3 of this volume will travel at the AM and PM peak hours and 1/3 will travel in midday. By adding this third to the background traffic, the total volume of peak hourly traffic is determined. Background traffic was determined through the use of data provided by CALTRANS. The results may be seen in Figure 34. In the year 2000, virtually every major highway will be operating well beyond capacity, as in 2020.

In 2000, for example, the volume of peak hour traffic on Seaside will be almost double its design capacity, while in 2020 there will be 10159 vehicles per hour one way on a street with a one way design capacity of 1500. This kind of excess traffic is indicative of virtually every roadway within the network.

Adequate information and data were very difficult to obtain and in some cases impossible. Therefore the procedures and conditions described above are intended to be only gross approximations and not a precise analysis of the road system in and around the Los Angeles - Long Beach Harbor area. Regardless, it can be seen that major problems will occur in the future.

Aviation

The aviation facilities in the ports vicinity consists of 6 heliports, one seaplane base and Reeves Field, an unused former Naval airfield. Nearby airports include Compton Municipal Airport, Torrance Municipal Airport, Long Beach Municipal Airport and Los Angeles International Airport.

The Federal Aviation Administration, in a publication entitled "Projection of Cargo Activity at U.S. Air Hubs" dated January 1977 estimates an increase in air freight at Los Angeles International Airport of from 146,324 tons in 1977 to 176,146 tons in 1987.

No figures are available as to how much of the port's commodities are handled by air before or after shipping, therefore an impact of increased ports traffic on aviation facilities cannot be determined.

An analysis of port traffic interfacing with air traffic needs to be undertaken at the next level of study to determine increased traffic to be anticipated at the above already congested airfields. The proposal to use Reeves Field as a general aviation facility conflicts with the plan of Los Angeles Harbor to use Terminal Island in the vicinity of Reeves Field for break bulk, dry bulk handling, or tank storage.

Transit

The transit system in and around the ports consists of private autos and buses. See Figure 34 for the existing bus routes.

The future projections for cargo indicate growth will occur primarily in container dry and liquid bulk commodities. These activities are not labor intensive, although increase in the labor force may result due to the great increase in cargo to be handled at the ports. The additional traffic generated by this increased labor force will cause a worsening to the roadway system along with the increased truck traffic associated with higher levels of cargo movement as discussed in the section under Highways. To alleviate the problem, a greater reliance on mass transit must be encouraged.

The origin/destination of Long Beach Port employees is given in the following table for 1974.

<u>Area of Residence</u>	<u>% of Employees</u>
City of Long Beach	39.9
South Bay Cities	
South Section	22.5
North Section	5.3
South Central L.A.	6.4
Southeast County	6.0
Other L.A. County	9.2
Other Counties	<u>10.7</u>
Total	100.0%

The same data is not readily available for the Port of Los Angeles. However, Port of Long Beach statistics indicate that over 60% of the employees at the ports live in the cities adjacent their place of employment. A commuter service for employees would aid in easing peak hour traffic loads, and would be effective if used by people within a short radius of the ports. Actual route designation for commuter service would require a more detailed location designation for employees.

Inland Waterway Traffic

An analysis of the utilization of the Los Angeles River and the Dominguez Channel for inland barge traffic was undertaken to determine feasibility of such a proposal.

The Los Angeles River barge traffic was looked at going up as far as the Golden State Freeway and the San Bernardino Freeway, adjacent to the major railroad yards in metropolitan Los Angeles. This distance would be about 20 miles by barge, and would require a system of 10 locks and dams to reach the 200 foot altitude necessary. The operations of the Los Angeles County flood control system would have to be altered to provide a more even supply of water to operate the series of locks and dams to allow barge traffic. The revised operation would require storage of water behind the flood control dams, thereby reducing flood control capacity. Even with the revised operation, the scarcity of water in Southern California would likely cause an interruption of the barge operations.

Due to the high cost of the system, the loss of flood control capacity and the uncertainty of operations, barge traffic on the Los Angeles River was determined to be infeasible. For the same reasons barge traffic on the Dominguez Channel was determined to be infeasible. As addressed earlier, studies are ongoing to use the Los Angeles River and the Dominguez channel as a right of way for other possible modes.

Transportation Costs

A representation of transportation cost for truck and rail shipments can be found in Appendix B of the Aerospace Corporation Analysis of the Alternative West Coast Port Systems. The rates are broken down by commodity type, origin/destination, and rate per ton.

The rates for truck routes and rail shipments are for generally longer movements all over 25 miles. Rates for short haul intermodal movements will have to be obtained by contacting truck and rail operators. The major mode of shipment for commodities shipped from and to the ports likely will not change for commodities going out of metropolitan Los Angeles. The modal mix of commodities in transit in metropolitan Los Angeles may likely change as one mode or another is subject to excessive delay due to traffic congestion.

Data requirements to compute transportation costs include the following:

<u>Highway Traffic</u>	= A hauling cost for short haul intermodal movements
<u>Railroad</u>	= An hourly operating cost as well as an average short haul unit cost
<u>Pipelines</u>	= A unit cost of movement per mile at varying levels of operation.

Costs should be correlated to short ton loads to determine a rate per ton/mile for various cargo types. This information can be derived from surveys of operations of each mode of transportation.

The following tables display truck and rail costs for various loads and trip lengths.

TRUCK SHIPPING RATES

Shipment Category	Commodity	Origin	Destination	Miles	Rate (cent/100 lb)*	Rate (\$/ton)*
Break Bulk	bagged fertilizer	San Pedro, Ca.	Riverside, Ca.	66	54	10.80
	bagged fertilizer	San Pedro, Ca.	Bakersfield, Ca.	148	73	14.60
	bagged fertilizer	San Pedro, Ca.	Fresno, Ca.	257	96	19.20
Dry Bulk	fertilizer	San Pedro, Ca.	Riverside, Ca.	66	54	10.80
	fertilizer	San Pedro, Ca.	Bakersfield, Ca.	148	73	14.60
	fertilizer	San Pedro, Ca.	Fresno, Ca.	257	96	19.20
Liquid Bulk	molasses	San Pedro, Ca.	Riverside, Ca.	66	39	7.80
	molasses	San Pedro, Ca.	Bakersfield, Ca.	148	57	11.40
	molasses	San Pedro, Ca.	Fresno, Ca.	257	80	16.00
Container	clothes	San Pedro, Ca.	Riverside, Ca.	66	140	28.00
	clothes	San Pedro, Ca.	Bakersfield, Ca.	148	172	34.40
	clothes	San Pedro, Ca.	Fresno, Ca.	257	203	40.60
Liquid Bulk	kerosene	L.A. Harbor	Phoenix	444	84	16.80
	kerosene	L.A. Harbor	Albuquerque	905	288	67.60
	kerosene	L.A. Harbor	Denver	1,365	400	80.00
	distillate fuel oil	L.A. Harbor	Phoenix	444	51	10.20
	distillate fuel oil	L.A. Harbor	Albuquerque	905	191	38.20
	distillate fuel oil	L.A. Harbor	Denver	1,365	215	43.00
	molasses	L.A. Harbor	Salt Lake City	794	112	22.40
	molasses	L.A. Harbor	Denver	1,365	154	30.80
	molasses	L.A. Harbor	Las Vegas	347	123	24.60
	soy bean oil	Los Angeles	Salt Lake City	794	163	32.60
	soy bean oil	Los Angeles	Denver	1,365	192	38.40
	soy bean oil	Los Angeles	Grand Island, Neb.	1,779	192	38.40
Container	clothes (trailer)	L.A. Harbor	Salt Lake City	794	643	128.60
	clothes (container)	L.A. Harbor	Denver	1,365	705	141.00
	clothes (container)	L.A. Harbor	Grand Island, Neb.	1,779	705	141.00
	clothes (container)	L.A. Harbor	Fargo, N.D.	2,103	825	165.00
	freight (trailer)	L.A. Harbor	Phoenix	444	193	38.60
	freight (trailer)	L.A. Harbor	El Paso	933	408	81.60
	machinery, parts	L.A. Harbor	Moberly, Mo.	1,920	719	143.80
	machinery, parts	L.A. Harbor	Phoenix	444	215	43.00

*1976 Dollars

Source: "Analysis of Alternative West Coast Port Systems" - The Aerospace Corporation.

RAIL SHIPPING RATES FOR THE LOS ANGELES AREA

Shipment Category	Commodity	Origin	Destination	Miles	Rate (cent/100 lb)*	Rate (\$/ton)*
Break Bulk	printing paper	L.A. Harbor	Salt Lake City	794	186	37.20
	printing paper	L.A. Harbor	Las Vegas	347	186	37.20
	printing paper	L.A. Harbor	Grand Island, Neb.	1,779	244	48.80
	lumber	L.A. Harbor	Phoenix	444	111	22.20
	lumber	L.A. Harbor	Salt Lake City	794	150	30.00
	steel bars	L.A. Harbor	Moberly, Mo.	1,920	380	76.00
	steel bars	Los Angeles	Salt Lake City	794	109	21.80
	steel bars	Los Angeles	Las Vegas	347	109	21.80
	electrical eqpt.	L.A. Harbor	Billings, Mont.	1,463	680	136.00
	electrical eqpt.	Los Angeles	Las Vegas	347	232	46.40
	electrical eqpt.	Los Angeles	Moberly, Mo.	1,920	719	143.80
	iron ore	Phoenix	Los Angeles	431	81	16.20
	iron ore	Fargo, N.D.	L.A. Harbor	1,838	161	32.20
Dry Bulk	iron ore	Casper, Wyo.	Los Angeles	1,694	320	64.00
	gypsum	Los Angeles	Phoenix	431	86	17.20
	gypsum	L.A. Harbor	Denver	1,365	244	48.80
	alumina	L.A. Harbor	Ft. Worth, Tex.	1,549	273	54.60
	alumina	L.A. Harbor	Salt Lake City	794	286	57.20
	alumina	L.A. Harbor	Fresno, Ca.	273	166	33.20
	iron ore	Phoenix	Los Angeles	431	81	16.20
	iron ore	Fargo, N.D.	L.A. Harbor	1,838	161	32.20
	iron ore	Casper, Wyo.	Los Angeles	1,694	320	64.00

*1976 Dollars

Source: "Analysis of Alternative West Coast Port Systems" - The Aerospace Corporation.

**TRUCKING COSTS BY LENGTH OF HAUL
AND LOAD SIZE PER 100 POUNDS**

HAUL LENGTH	Item	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
		0 - 99	100 - 499	500 - 999	1000 - 1999	2000 - 4999	5000 - 9999	10,000 - 19,999	20,000 - 29,999	30,000 - 39,999	40,000 & Over						
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)						
25 MILES (2 TERMINALS)																	
Total Terminal Cost		16.4345	6.4312	3.7663	2.8184	2.0816	1.4730	0.8100	0.6219	0.5171	0.4603						
Line Haul Cost		.2349	.2349	.2349	.2349	.2349	.2349	.1272	.1272	.1272	.1272						
Total Direct Cost		16.6694	6.6661	4.0012	3.0533	2.3165	1.7079	.9372	.7491	6.443	.5875						
50 MILES (2 TERMINALS)																	
Total Terminal Cost		16.4345	6.4312	3.7663	2.8184	2.0816	1.4730	0.8100	0.6219	0.5171	0.4603						
Line Haul Cost		.3445	.3445	.3445	.3445	.3445	.3445	.1855	.1855	.1855	.1855						
Total Direct Cost		16.7790	6.7757	4.1108	3.1629	2.4261	1.8175	.9955	.8074	.7026	.6458						
100 MILES (2 TERMINALS)																	
Total Terminal Cost		16.4345	6.4312	3.7663	2.8184	2.0816	1.4730	0.8100	0.6219	0.5171	0.4603						
Line Haul Cost		.5377	.5377	.5377	.5377	.5377	.5377	.2924	.2924	.2924	.2924						
Total Direct Cost		16.9722	6.9689	4.3040	3.3561	2.6193	2.0107	1.1024	.0143	.8095	.7527						
200 MILES (2 TERMINALS)																	
Total Terminal Cost		16.4345	6.4312	3.7663	2.8184	2.0816	1.4730	0.8100	0.6219	0.5171	0.4603						
Line Haul Cost		.9061	.9061	.9061	.9061	.9061	.9061	.5257	.5257	.5257	.5257						
Total Direct Cost		17.3406	7.3373	4.6724	3.7245	2.9877	2.3791	1.3357	1.1476	1.0428	.9860						
400 MILES (2 TERMINALS)																	
Total Terminal Cost		16.4345	6.4312	3.7663	2.8184	2.0816	1.4730	0.8100	0.6219	0.5171	0.4603						
Line Haul Cost		1.5607	1.5607	1.5607	1.5607	1.5607	1.5607	.9372	.9372	.9372	.9372						
Total Direct Cost		17.9952	7.9919	5.3270	4.3791	3.6423	3.0337	1.7472	1.5591	1.4543	1.3975						
700 MILES (3 TERMINALS)																	
Total Terminal Cost		19.1529	7.5882	4.5139	3.3599	2.4457	1.6634	0.8100	0.6219	0.5171	0.4603						
Line Haul Cost		2.4555	2.4555	2.4555	2.4555	2.4555	2.4555	1.4561	1.4561	1.4561	1.4561						
Total Direct Cost		21.6084	10.0437	6.9694	5.8154	4.9018	4.1189	2.2661	2.0780	1.9732	1.9164						

Source: Public Utilities Commission, State of California.

**DEVELOPMENT OF RUNNING EXPENSE
PER UNIT OF EQUIPMENT
(Pickup and Delivery Operation)**

	Item	Power Unit Per Mile	Trailer Per Mile	No. of Trailers	Trailers Per Mile	Converter Gear Per Mile	Total Direct Cost Per Mile
2	Axle Pickup Truck (Local Truck)	0.221	—	—	—	—	0.221
2	Axle Local Tractor and 1 Axle Semi-Trailer	0.247	0.031	1	0.031	—	0.278
2	Axle Local Tractor and 1 Axle Doubles	0.247	0.031	2	0.062	0.018	0.327
2	Axle Local Tractor and 2 Axle Semi-Trailer	0.247	0.043	1	0.043	—	0.290
2	Axle Line Tractor and 1 Axle Doubles	0.237	0.031	2	0.062	0.018	0.317
3	Axle Line Tractor and 2 Axle Semi-Trailer	0.249	0.043	1	0.043	—	0.292

Source: Public Utilities Commission, State of California.

DEVELOPMENT OF VEHICLE RUNNING COST PER MILE

Item	Deprec./ Mile	Fuel/ Gallon	Miles/ Gallon	Cost/ Mile	Oil	Tires & Tubes	Rep. & Maint.	Total Running Cost
Van - 2 Axles - Gas	-	0.552	5.9	0.094	0.002	0.012	0.131	0.239
Tractor - 2 Axles - Gas	-	0.552	4.4	0.125	0.003	0.014	0.125	0.267
Tractor - 2 Axles - Diesel	-	0.515	5.1	0.101	0.003	0.015	0.137	0.256
Tractor - 3 Axles - Diesel	-	0.515	5.1	0.101	0.003	0.023	0.142	0.269
Semi-Trailer (short) - 1 Axle	-	-	-	-	-	0.007	0.026	0.033
Semi-Trailer (long) - 2 Axles	-	-	-	-	-	0.014	0.032	0.046
Converter Gear - 1 Axle	-	-	-	-	-	0.007	0.012	0.019
Tractor - 2 Axles - Diesel (800,000 mile basis)	0.027	0.515	5.1	0.101	0.003	0.015	0.137	0.283
Tractor - 3 Axles - Diesel (800,000 mile basis)	0.034	0.515	5.1	0.101	0.003	0.023	0.142	0.303

Source: Public Utilities Commission, State of California.

REGIONAL TRANSPORTATION: BARRIERS TO EFFICIENT ACCESS

This section enumerates major barriers to the efficient movement of commodities from the San Pedro ports to regional and national destinations. The analysis is qualitative in approach and is designed to provide a summary overview of major observed problem areas.

For the purpose of this analysis, the region is coterminous with the boundaries of Los Angeles County.

Rail System

The rail system in Los Angeles County may be described as an arterial system, with mainline connections to points east through the San Gabriel Valley and points north through the San Fernando Valley. The major track system in the County is operated by Southern Pacific. This predominant position was a result of acquisition of Pacific Electric Lines (The Red Car), which developed a network of track to serve nearly all major economic centers in the Los Angeles Basin.

Major classification and container handling yards for the three railroads are located in or near downtown Los Angeles which are "midpoints" for easterly and northerly bound traffic. In addition, new computerized hump yards are located in Colton and Barstow which provide classification for trains entering the region and as a means of diverting traffic from the Los Angeles Basin (for freight with destinations other than Southern California).

Discussions with representatives of the 3 railroads led to the identification of several issues of regional concern -- foremost among these is the growth of the container cargo market and its impact upon port areas and regional operations. Under present conditions, ships offload the containers, which are transferred to trucks and then transported to the 3 major container handling yards near downtown Los Angeles. As a consequence, an intermodal transfer is required. The railroads would appear to prefer direct rail transfer at the ports if facilities were available. However, several problems were identified by the rail company representatives which may preclude such a facility, namely:

- Community relations problems (related to noise and traffic congestion) with various local governments along the main and branch line rights of way
- Lack of available land to construct new trackage which would avoid the highly urbanized central Los Angeles Basin
- Potential problems of cooperation among the railroads related to shared technology and trackage.

Although these problems are not insurmountable, they do pose a barrier to efficient container movement between the ports and external markets.

In addition to the container issue, the rail company representatives identified general congestion-related problems such as train/street traffic conflicts.

Truck Transport System

In Los Angeles County, truck transportation is facilitated by an extensive network of freeways. In general, these freeways provide 8 lanes of traffic flow (4 lanes in opposing direction). Routes have been constructed to serve virtually any inter-regional location and tie-ins are present with all major state-wide and transcontinental highways.

The major barrier to regional truck transportation, vis-à-vis the freeway system, is congestion -- which is recognized by virtually everyone in southern California. In fact, freeway congestion in Los Angeles is of such monumental proportions that numerous abortive attempts have been made to provide an alternative rapid transit system.

Freeway congestion is most prevalent between 6:30 a.m. and 8:30 a.m. and between 3:00 p.m. and 6:00 p.m. At these peak load periods, flow is reduced to a virtual standstill at many points throughout the network. Major congestion points in the network are as follows (refer to Figure 34):

- San Diego Freeway (405) -- Major bottlenecks occur between the Ventura Freeway interchange and Los Angeles Airport, between Manhattan Beach and Carson, through Long Beach and at the 605 interchange.
- Ventura Freeway (101) -- Congestion barriers occur between Reseda Boulevard and the Hollywood Freeway interchange.
- Santa Ana Freeway (5) -- This freeway is congested between downtown Los Angeles and the 605 interchange near the city of Norwalk.
- Artesia Freeway (91) -- Between the Long Beach Freeway (7) and the San Gabriel Freeway (605), the Artesia Freeway is heavily congested.
- Harbor Freeway (11) -- Between the 405 interchange and Pasadena, the Harbor Freeway is heavily congested.
- Long Beach Freeway (7) -- This freeway is heavily congested between Stauson Avenue and the Santa Ana Freeway Interchange..

- Pomona Freeway (60) -- Between Hacienda Heights and the Long Beach interchange, the Pomona Freeway experiences heavy congestion at peak periods.
- San Bernardino Freeway (10) -- This freeway experiences heavy congestion through Alhambra and near the San Gabriel Valley (605) interchange.
- Foothill Freeway (210) -- Recently developed, the Foothill Freeway experiences heavy congestions near Sierra Madre and Arcadia.
- Hollywood Freeway (170-101) -- This freeway experiences heavy congestion between Burbank Boulevard and Barham Boulevard and between Normandie and downtown Los Angeles.

The above described freeway system barriers form a significant obstacle to efficient truck transportation and, in addition to delay time, generates decreased fuel efficiency and increased truck maintenance costs (both of which most likely affect operations costs and provide impetus for growth in cargo rates).

As stated, several solutions have been attempted to reduce congestion and have apparently met with little or no success. Moreover, with the increase in inter-modal container traffic anticipated by the railroads, general growth in truck cargo demand, and growth in the regional population (especially in outlying suburbs), freeway congestion will most likely increase; this in turn will cause further delays and a continuation of present barriers to efficient regional access.

Pipeline System

The pipeline system in Los Angeles County may be described as a highly complex network of interconnecting transmission lines, designed to serve both regional and national destinations. The lines are, for the most part, privately owned and operated by the major southern California oil companies and transport both crude and refined oil--along with natural gas, slurry coal and other products.

Based upon discussions with staff personnel in the Southern California Association of Governments (SCAG), there appears to be insufficient storage capacity to accommodate the recent growth in oil shipments brought about by the Alaskan pipeline. This is basically a result of the delay in construction of the SOHIO pipelines from Long Beach Harbor to Midland, Texas. Further, if additional pipeline construction were not to take place, it is highly likely that an inter-modal transport system, which includes rail and or trucks, would be required to meet shipping needs. This additional burden on either or both of these modes could have a significant impact upon modal capacity--especially since nearly 75 percent of port area cargo is offloaded by pipe.

The SOHIO project is designed to relieve the pipeline capacity burden (related to Alaskan oil movements). However, if the project were to be delayed further or abandoned, then rail and/or truck transport capacity limits could conceivably be exceeded in the next few decades.

Among on-going analyses to be made are the following:

Origin and destination of commodities: to allow the determination of the mode most likely to transport particular goods.

Port operations: to determine the possibility of 24 hour operation to help alleviate peak hour traffic congestion.

Pipelines

Liquid bulk movements: to determine total movements of liquid bulk cargoes within the primary study area.

Pipeline capacities: pipeline capacities beyond immediate off-loading facilities.

Refinery capacities and locations of future facilities: to determine the maximum refining capacity of facilities served by the ports.

Highways

Highway capacities: for freeways, major highways and arteries, to be used as a basis of comparison to present and future traffic flows.

Background traffic for the years 2000 and 2020: to be used in projections of future traffic volumes.

Percentage of trucks on the roadway system: to allow determination of the impact of increased truck traffic.

Average truck's hauling capacity (in tons): to determine the increased number of trucks operating on the roadway system.

Mass Transit

Detailed information on residences of employees of the Port of Los Angeles and Long Beach and the Long Beach Naval Facilities: to aid in the determination of the feasibility of various mass transit alternatives to help alleviate traffic congestion.

Railroads

Total tonnage carried by rail: to determine existing use of railroads.

Identification of possible internal operating improvements: to allow determination of causes of delay time for rail movements.

Modal split between railroads and trucks: to allow determination of the potential utilization of individual transportation networks.

Waterways

Actual cost of locks and dams for the Los Angeles River: to determine feasibility for barge traffic.

Air

Quantity of commodities handled by air transport: to determine the extent of the air-sea interface.

All Modes

Development of demand for transport modes based on pricing, convenience and other relative variables.

* * * * *

CHAPTER VI

IMPLEMENTATION AND FUTURE INVESTIGATION

The initial stage of the transportation plan (Reconnaissance Report) has, in accordance with ER 1105-2-220, focused on problem identification, formulation of alternatives, and their impact environmental assessment and evaluation. The task has been primarily to:

- identify public concerns
- analyze resource management problems
- define the study area
- describe the base condition
- project future conditions
- establish planning objectives.

The results have been summarized in the Alternative Analysis Matrices for Engineering and Environmental Impact, respectively.

The ongoing process and needs form Stage 2, Development of Intermediate Plans, as laid down in ER 1105-2-200 series. This second stage emphasizes a more detailed evaluation without concentrating on engineering or design considerations.

A review of the alternatives analysis has revealed that there are some transportation facilities which are ready for immediate improvement or development; indeed, some of these are already overdue and should be tackled without delay. However, there are others which will require further study to develop their value in the overall transportation system plan. Some arrangements can be developed separately from others (although, of course, this must be done in total conformance with the overall transportation plan), whereas, in others, any changes will immediately impact both short- and long-range plans and the physical position in which they are located. A critical path network-type diagram, illustrating provisional program development, is presented as Figure 35.

Listed below is a number of early action problems to be addressed:

- refinement of cargo projections
- analysis of modal split
- projections of cost
- research into funding sources
- study of plans of others for integration/coordination
- initiation of study of transit needs
- study of freeway/highway traffic
- investigation into application of developing technology
- quantification of data for further environmental analysis, particularly air quality

- development of mini- and land-bridge operations
- provision of economic analyses and tradeoffs of viable alternatives
- initiation of a master plan for pipeways, with special attention to be given to the Long Beach Naval Facilities forthcoming "home-porting" of additional naval vessels and their bunker fuel needs
- nomination of a lead agency to develop plans for multi-modal transportation of people (including waterways) and its relationship with the two ports and the naval personnel
- development of barge traffic potential on the flood-control channels and establishment of facilities/interface arrangements to suit
- consideration of energy matters relative to the cumulative conservation effects of the alternatives, and long-term plans in respect of efficacy of actions to be taken and the impacts on air pollution (i.e., decentralization of plants)
- review of possible bike routes in the port area
- updated consideration of triple-trailer operations in California (up to the year 2000) and the changes/modifications required to the transportation plan
- provision of a land-use management plan commensurate with the goals and objectives of the transportation plan
- quantification of environmental impacts
- application to the transportation plan of the provisions and constraints of the General Accounting Office Report on Liquified Energy Gases Safety (EMD-78-28, dated July 31, 1978).

Modal Alternatives

1. Railroads

A rail organization plan to handle existing traffic is overdue. However, with the daily increasing cargo and the projections to the year 2000, the plan is one which must be developed forthwith. The rail reorganization plan described in Chapter III is no more than the beginning of a large number and variety of activities required to place it into effect. Change in priorities and circumstances may occur between now and the anticipated time of completion. For example, J Yard (Long Beach) might be adapted for piggyback traffic handling. This would have the required effect of increasing the effectiveness of trailer-on-flat-car (TOFC) and container-on-flat-car (COFC) operations. Furthermore, it will be necessary to stage construction in conjunction with physical and financial constraints. Nevertheless, it will probably be 15 to 20 years before the total plan is completed, so an immediate start is essential to achieve the objectives commensurate with increased cargo-handling needs.

The basic steps proposed for railroad development have been shown on the CPN-type diagram Figure 35; however, a more detailed scope of work will be essential. In order to achieve this, a considerable amount of coordination is required, as the new rail configuration covers many interests, including the ports, tenants, unions, regulating agencies, and shippers. One of the earliest tasks to be addressed is the solicitation of full agreement of the railroads in regard to future operations as well as the details of the physical plant. Legislation must also be taken into account if the area of operations of the Harbor Belt Line are to be extended, or other operating agency established, as recommended.

2. Highways

The changes in the roadnet system required to meet the cargo projections to the year 2000, as presently developed, consist of three elements, namely:

- freeway extension, widening, and capacity improvement
- improvement in arterials and freeway feeder system
- the solution of specific problem points within the port area.

It is obvious that the roadnet system must be dealt with as a whole. However, one small problem area, if not solved, could completely impact a large portion of the remainder of the highway network and therefore must be integrated into the remainder of the system considerations. The alternative analysis has dealt, in qualitative terms, with what must be done; the next development in the intermediate plan should now refine these details by initiating traffic studies and analyses at various locations in order to justify the details of improvement in quantitative terms. An early problem to be solved is that relating to the jurisdiction under which this activity should be conducted, since a large number of agencies are involved in the overall roadnet system. A number of such agencies have already been identified in Chapter III under the Highway Section.

The traffic studies will require analysis of the volume-to-capacity (V/C) relationship on the highways which make up the port circulation system. They should be aimed at moving cargo from the ports to the freeway system and thus to the remainder of the country which the ports serve. They also will be required to take into account future transit uses (bus-on-freeway, local transit, dial-your-ride, etc.) and any diversion effected by a local fixed-guideway system. Also to be incorporated into the traffic analysis are triple-trailer operations (because of the possibility of their being introduced into the State of California by legislation).

Additional items involved in the traffic analysis will be matters of safety, highway blockage, catastrophe, and national defense. Deficiencies must be eliminated, and alternatives provided by improved networks

serving the ports must be established. The traffic analysis will also require identification of the consequences of the "without project condition" alternative, as well as non-port-related considerations.

The traffic analysis must be worked in conjunction with other systems involved in the San Pedro ports transportation plan. In particular, bottleneck points, rail-highway grade crossing protection and elimination, and construction of freeways, should also be reviewed relevant to overall transportation needs provided by alternative modes. Conflict must be avoided in developing a traffic plan leading to highway construction. For example, the extension of the I-47 Industrial Freeway can no longer be constructed at grade over the area where the rail classification yard is to be built. (An elevated freeway or an alternative alignment paralleling the Union Pacific Railroad may be desirable.) The requirements of a highway based on the selected option for Badger Avenue Bridge must be confirmed.

A traffic study will be required to detail how best the capacities over the Gerald Desmond Bridge and the Commodore Heim Bridge can be increased. A recommended method is instituting duodirectional traffic at certain times of the day with appropriate signalization and other safeguards, unless prevented by installation of median barriers.

Amalgamation between the San Pedro ports' proposed roadnet and the road plans of the City of Long Beach is needed.

An overall traffic analysis could appropriately deal with areas peripheral to the port transportation plan. Items to be considered include building the I-105 El Segundo-Norwalk Freeway from I-605 San Gabriel Freeway to the Los Angeles International Airport and making improvements on Gaffey Street, San Pedro, which presently accepts all traffic exiting the south end of the Harbor Freeway (SR-11).

The results of all the traffic analyses, being in a form of a quantitative prognosis, should then be developed into a refined overall plan for roadnet development as a whole. In the light of this, a financing and construction plan can then be set forth in coordination with all agencies involved.

3. Transit

A needs study should be initiated at an early date to define the future movement needs of people to, from, and within the port areas. It should take into account the additional employment resulting from the greater cargo throughput by the year 2000, as well as the inevitable population increase both adjacent to the area and beyond.

Investigation should be made as to how these increments can be met by the road network in conjunction with the highway analysis, whether

alternative guideway transit should be sought (and, if so, when) and which options and alternative modes to buses can be set forth for a later decision according to available technology. It may be found that some immediate need exists; the analyses will highlight these shortcomings and will determine how they can best be implemented by existing surface systems (either by roadnet or perhaps by water transportation). This needs study of the movement of people will also take into account how diversion from automobiles can be effected and will review the existing and future car parking arrangements, together with the distribution of people from these locations. "Dial-your-ride" and other such plans will be discussed in some detail with employees, transit operators and the unions. As it is possible that some transit routes may be diverted to flood-control channels (particularly in regard to access from downtown Los Angeles), determination must parallel other transit investigations.

4. Waterways

The reconnaissance report so far has merely made the suggestion that waterways would be conducive to movement of people and cargo within the total transportation plan for the ports and harbor area. A further study is now required to determine how best this can be effected and which routes would be the most desirable and implementable. The movement of people and cargo over waterways may be inside or outside the harbor area, and/or the flood-control channels, as described in Chapter III. A specific relationship therefore exists between these modes of transportation.

Part of the further study of waterways transportation should be an update in vehicle technology.

5. Pipelines

The plan for pipelines and pipeways is a master plan for the future rather than a plan for immediate implementation. The effort in the next phase is to establish a plan to be followed when new pipelines are to be installed. This will be made effective by earmarking desired routes for pipeways and pipelines, to serve as a datum when land acquisition, rights-of-way, and design of all other modes of transportation are placed into effect. It would be desirable at this stage to set forth firm definitions for development of specific pipelines; an example of this may be a product pipeline from the harbor area to Los Angeles International Airport along the Dominguez Channel right-of-way. It would also be appropriate to define design parameters for major pipeways in order to accomplish early implementation of the master plan. It will be opportune to include, for example, the rules for transportation of liquids regarding pipelines under consideration by the Waterways Transportation Bureau of the Federal Department of Transportation (Federal Register Vol. 43 No. 155).

It is recommended that joint use or consolidation of pipelines be considered potentially effective in dealing with the pipeway/ pipeline rationalization process.

6. Aviation

The development of air transportation and its associated facilities has not been defined as a major event in the total transportation plan of the San Pedro ports area. However, depending on the decision regarding the alternatives already defined, Stage II should serve to identify what further action should be taken in respect to either an overall aviation plan or the implementation of minor facilities as part of its general scenario. It will be desirable, for example, to look more closely into what types of cargo and personnel movement may be facilitated by the aviation mode prior to deciding on any implementation procedures. A decision on the intent for aviation is needed.

7. Flood-control Channels

Having identified certain possibilities for the use of flood-control channels within the overall transportation plan for San Pedro ports, Stage II should investigate further their use for specific cargo handling and/or transit use. This will involve private businesses for the development of facilities for processing and warehousing, as well as the Ports of Los Angeles and Long Beach for traffic handling. The railroads, too, would be involved in the event that transfer to rail is desirable.

8. Multi-modal Proposals

In order to complete the overall transportation plan for the San Pedro ports, a number of multi-modal items will require further investigation. These are listed below as far as they are known at this writing; others may arise from time to time as the plan develops.

a. Extension of Container-handling Arrangements. Because of the congestion of containers in the existing yards, the storage space taken by container units, and the slow, cumbersome method of loading and unloading them for multiple transportation from and to the ports, it is believed the time is now opportune to consider, as part of the transportation plan, new methods of container handling. Therefore, in addition to the combined container distribution center to be built adjacent to the automated classification rail yard, a transfer facility and transfer mode are proposed.

The object of these is to improve the speed and efficiency of container handling and to reduce the storage time and space as they now exist. Improved container handling would especially guarantee the success of the mini- and land-bridges; in fact, it may be essential before these extended operations can satisfactorily be undertaken. The following is a brief description of the two items.

Container Transfer. Essential to the concept is a fast, semi-automatic method of transferring containers on and off (unit) trains so as to expedite port operations and, at the same time, save both time and space in container storage. Such a facility could also, of course, apply to the handling of automobiles and other container-type units, imported or exported in quantity by ship. Transfer between other modes also appears to be possible, although the containers to be handled by unit trains would be the initial target. Figure 36 shows the concept.

By increasing the speed at which containers are handled (and thereby moved more quickly through the port), and simultaneously by reducing storage space for containers, this system could produce a competitive edge for the ports of Los Angeles and Long Beach and increase their revenue while, at the same time, enabling them better to handle the additional traffic anticipated by the year 2000 without significant additional space requirements. It may also be instrumental in decreasing ships' loading and unloading times--always a desire of shipping lines to avoid excessive downtime of their vessels.

Proposed Inter-Yard Container Movement. Reference is made (in Chapter III) to the need to build a combined container distribution center, probably in an area adjacent to the rail classification yard, to serve the San Pedro ports. If such a facility were to be built, it could not stand in isolation without appropriate feeder transportation systems. The primary mode will, of course, be rail both inward and outward between dockside and the overland tracks; this will include transfer between the dockside and nearby existing container-storage yards and the new remote container terminals. Facilities for this transfer are provided in the rail plan. However, it is believed that the locations should, and could, conveniently be linked by a discrete system, especially a system which would not require extensive new rights-of-way and would not add to traffic congestion. Such a system could be implemented with a specially dedicated monorail (illustrated in Figures 37a and 37b) by adapting the cars and conveyors to meet the requirements of handling standard-size container units.

b. Port of Long Beach Outer Harbor. It is desirable to rationalize transportation facilities on the outer harbor land mass of the Port of Long Beach with an in-depth analysis. The Port Authority has already made some temporary arrangements to divide road from rail, but a much greater effort is needed to deal with the area as a whole. In view of the anticipated increase of unit trains serving the grain terminal and bulk loader, exploration of a solution to avoid splitting unit trains at these locations is appropriate. Division of unit trains is contrary to their fundamental purpose; it also causes delays, inconvenience, additional costs, and reduced profit. The proposed Pier J expansion could serve as an incentive to initiate this additional effort.

c. The Cerritos Channel Crossing. Of the five options proposed in Chapter III, the preferred solution is a fixed bridge. This must become a multi-modal facility carrying rail tracks, highway, pipeways, and utilities consistent with water traffic (including transit and recreation). Defense and emergency considerations are also important in the solution to this problem.

d. Pier A/Windham Avenue Intersection (Long Beach). The transportation plan recognizes the need for improvement action at this location. This is currently in hand by the Port of Long Beach.

e. Air-cushion Vehicles. A real-time evaluation of the potential contribution of ACV's and surface-effect ships is needed. Their utilization will be important in people and cargo transport through the harbor and flood-control channels, in harbor supervision, in emergency services, as well as in fire and water services. This utilization could be extended along coastal waters (for example, between Santa Monica and San Clemente, paralleling the San Diego Freeway). The San Pedro ports would then function as a base of operations. As part of an extended system, other flood-control channels could serve some of the high-density industrial and residential areas (for example, Anaheim and Orange through the Santa Ana River and downtown Los Angeles through the Los Angeles River). Air-cushion vehicles and surface-effect ships should be deployed to connect transit, flood-control channels and waterways.

f. Power Lines. Power lines, as a transportation mode, have not been developed in the reconnaissance report. Having a "long-distance" connotation, and involving conversion facilities at the extremities, it has not been appropriate to do so within the primary area of the San Pedro ports. This possibility should not be entirely dismissed, however, as changes in the national economy and the vagaries in the movement pattern of bulk materials may cause their consideration within the next 20 years. Rights-of-way acquisition should, in any case, be considered for inclusion of power line supporting structures.

To enable the transportation plan per se to be implemented, some power lines will require local relocation; the classification yard area is a case in point. However, this is a matter to be dealt with in later activities relating to engineering design and land use management.

g. Foreign Trade Zone. The Port of Long Beach Master Plan raised the question of establishing a port-related foreign trade zone. If this does become a reality, transportation services will be required, and special attention will be necessary to assure that they adhere to the bonded process. These will primarily affect road and rail. As no provision has been made for these arrangements in the transportation plan, the question of the establishment of the FTZ should be examined further, and the required transportation arrangements at least planned within the total scenario.

In parallel with further analyses of modal alternatives and the development of the plans for each, management options must be resolved and lead agencies identified. Additionally, nomination of supporting participants will be necessary, and working procedures should be established. Following this, the lead agencies and their coparticipants will then be able to take over control of the activities for which they will carry future responsibility. Clearly, overall management and coordination must be established concurrently with the delegation of individual responsibilities.

It is firmly believed that the plans for railroad development and the solution to the many highway problems are already overdue. And although these two major elements are to be incorporated in the final transportation plan for San Pedro ports, the stage of development is such that implementation procedures can now be initiated. Partial development funding will be needed; this will result in preliminary design in the case of railroads and preliminary design of some segments in the case of highways. These procedures will lead to engineering options, calculations and related activity that will result in the production of the environmental impact documents.

Final Package

From the plan update and the environmental statement (which will include appropriate mitigation measures for construction and implementation), the total package for the transportation plan for the year 2000 will be produced. There will be four main elements, as follows.

1. The Final Plan. This will give full details of the transportation plan itself, the implementation methodology, schedules and management procedures. It will document the interface required between each mode and will state categorically how the projected cargo movements are to be handled in total.
2. The Financial Plan. This will give an estimate of the costs, the potential funding sources, and staging of expenditures. This part of the final plan will be set forth in order that sources of funds and applications for these funds may be identified. The financial staging plan will set forth the rates of expenditure, as well as the credits likely to accrue from the redundant assets and recoveries of plant and equipment. It will form the basis on which grant applications may be made and other loans applied for in accordance with the regulations of the agencies to be approached. A recommended list of such agencies will be set forth in the financial plan.

The financial section will also respond to the requirements of the National Economic Development, namely, Value of Increased Output of Goods and Services, and the Value of Output Resulting from External Economies.

3. Environmental Statement. As culmination of the activities of plan formation, alternative analyses, and financial planning, an Environmental Statement will be produced relative to the total transportation plan. This document will identify and discuss significant environmental elements associated with the various modal alternatives and will deal with all environmental effects, mechanization measures, and construction procedures either for each mode, or modal mix, fully to conform with the federal regulations on environmental quality. The EIS will state actions to be taken in respect to the individual plan elements, both short term and long term. It will also identify the approval and permit agencies involved and will document the extent to which they have previously been consulted during the planning process to date. It will set forth any sensitive developments and mitigation measures which must be adhered to in the next stage of implementation, particularly that involving design and plant. It is also probable that it will evaluate the merits of modal mix to the extent that these are to be effected.

4. Executive Summary.

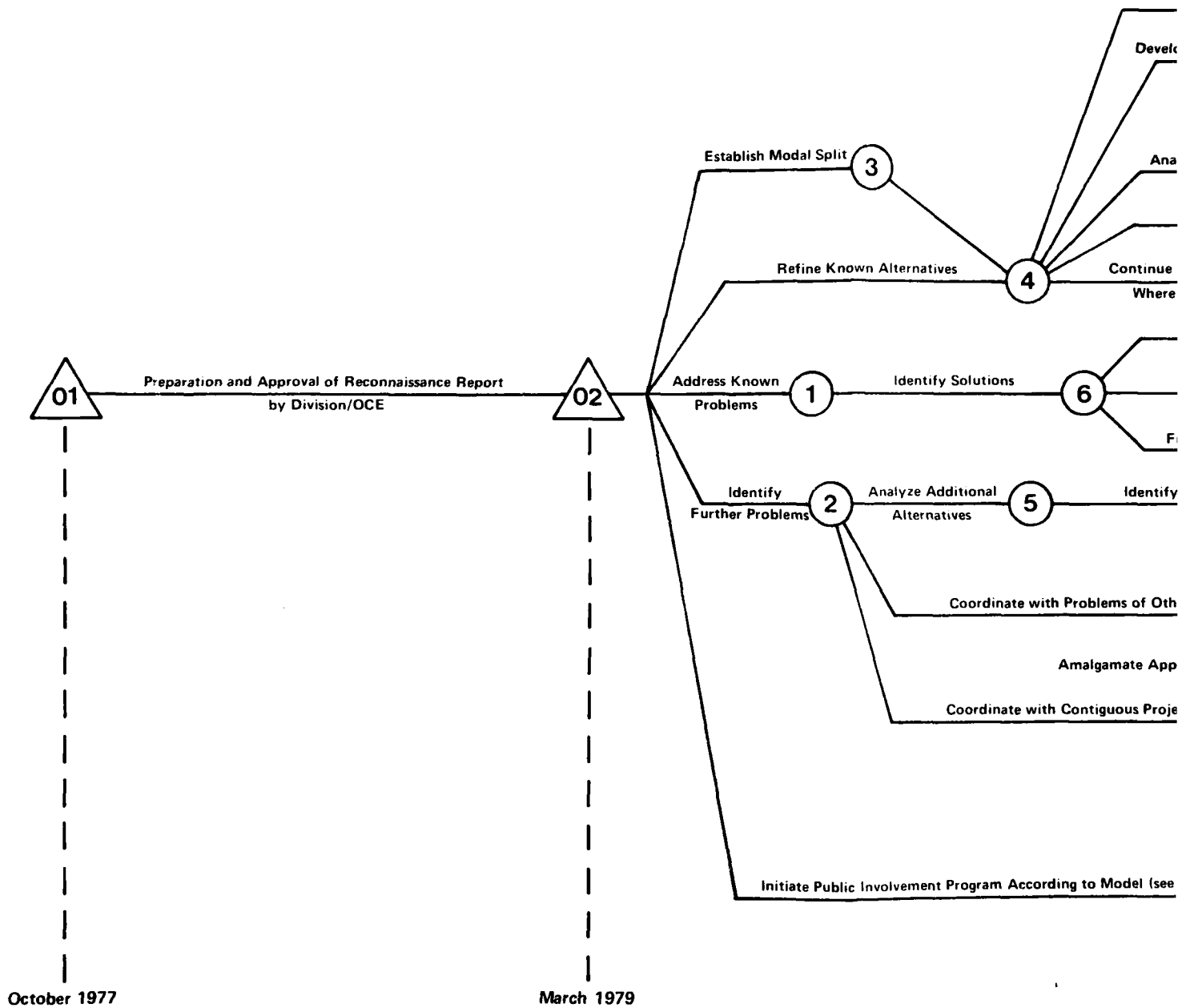
Continual reaction and input from the public is proposed at all times. This will be obtained by various features proposed, such as presentations, workshops, meetings, and public hearings. Public participation includes agencies, organizations, and associations, as well as private citizens.

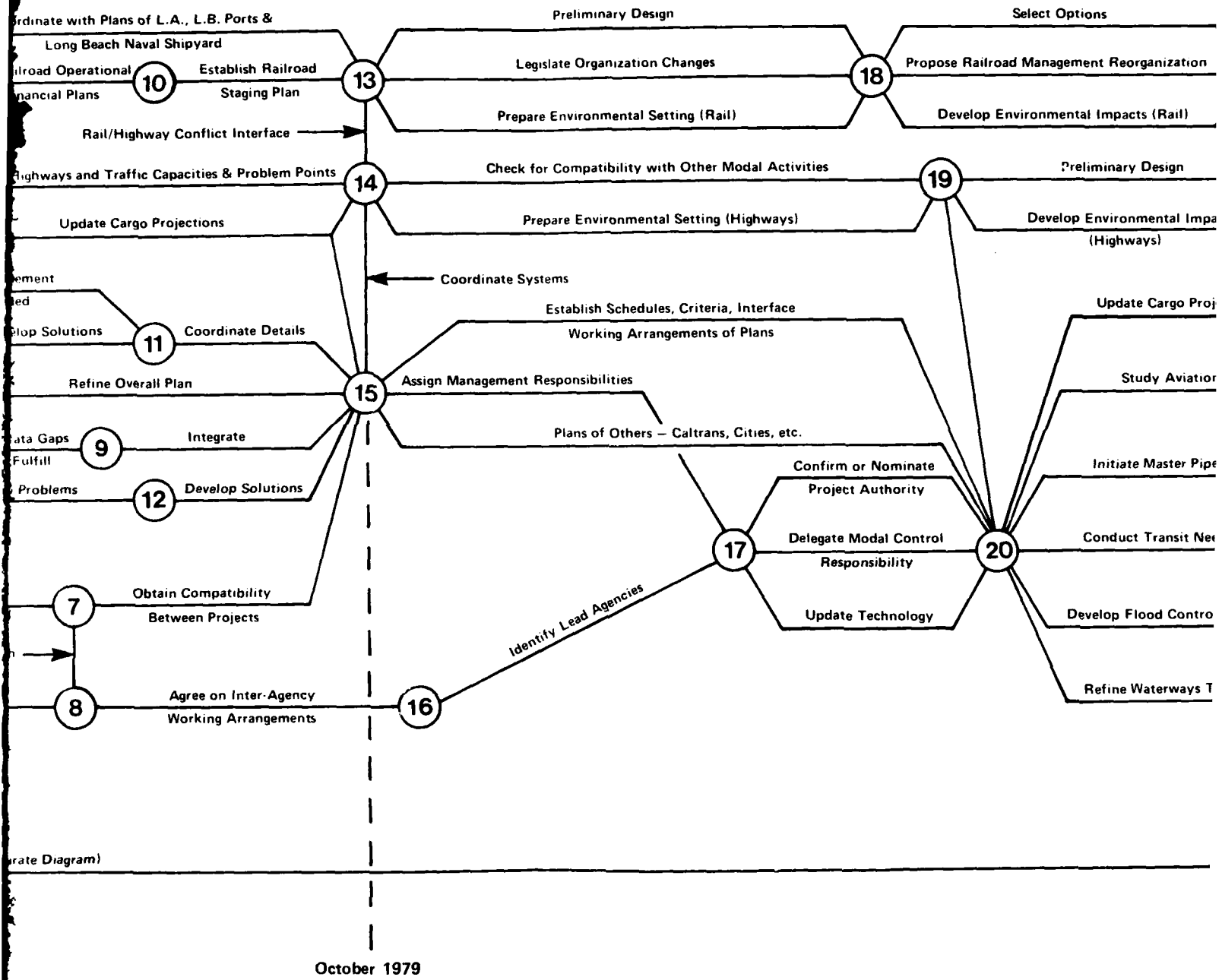
Procedures for the public to express their opinions, options, and desires are essential to the process of most expeditious implementation of the total plan. As a result of the referral from the public hearings, the plan can be updated, and an Environmental Impact Statement can be produced to include the concerns of citizen groups. Input procedures for plan update will be modified by the two ports and the Long Beach Naval Facilities as development takes place.

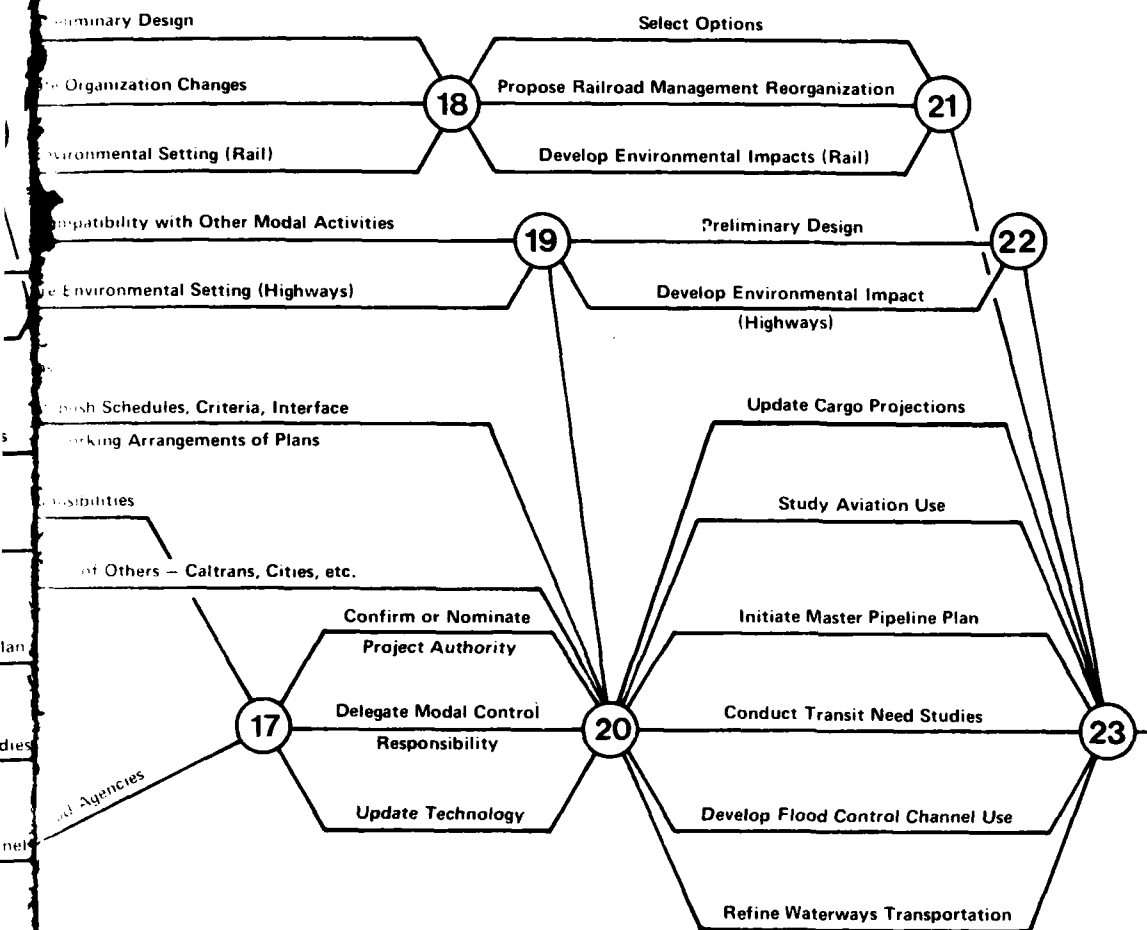
Schedule

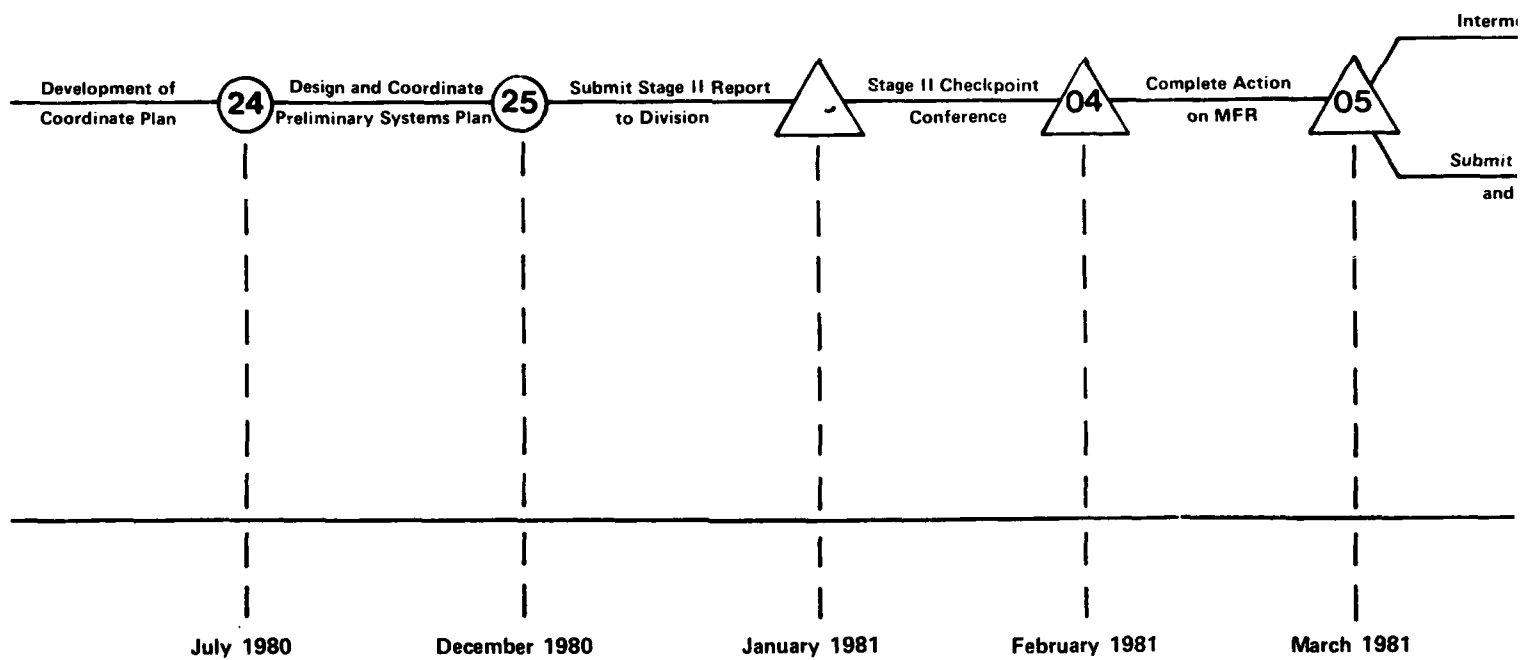
Commencing with the approval of the reconnaissance report it is anticipated that some 40 months will be required before the final plans, the financial arrangements, the Environmental Statement, and the Executive Summary will be completed. The CPN-type diagram, Figure 35, shows the approximate times at which each of the various activities will be achieved.

* * * * *









○ Indicate
△ Indicate

Intermediate Public Meeting

Public Meeting

Submit Draft Survey Report
and DEIS to Division

Submit Final Survey Report
and RDEIS to Division

06

Stage III Checkpoint
Conference

07

Complete Action on
Conference MFR

08

Coordinate Draft Survey
Report & DEIS

09

10

September 1981

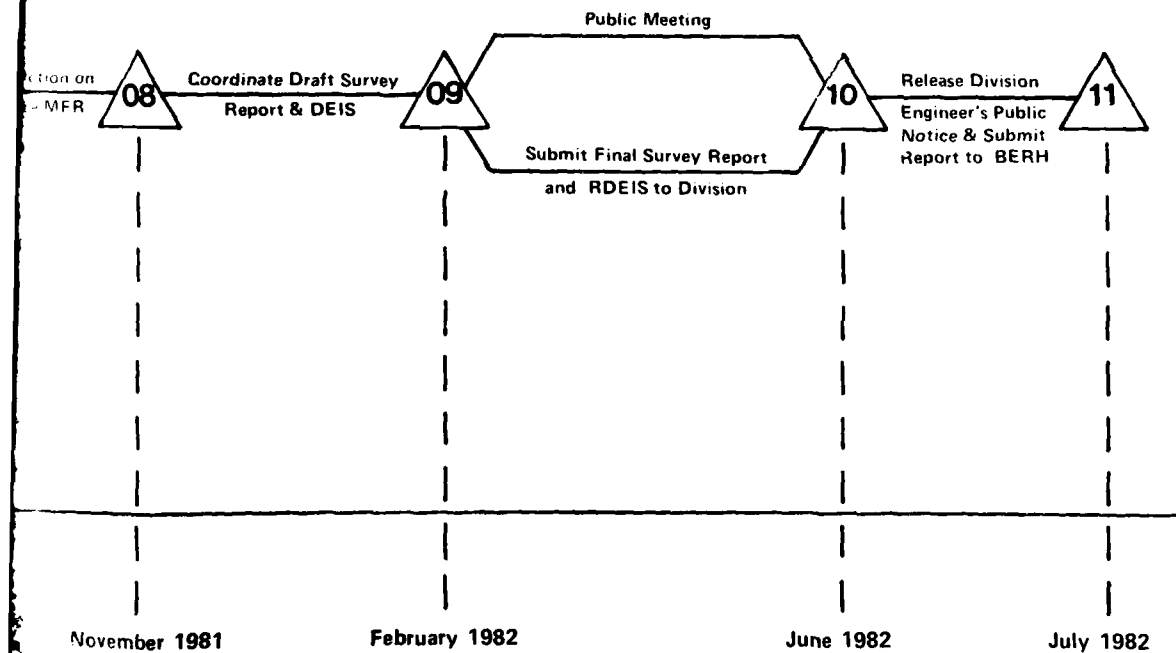
October 1981

November 1981

February 1982

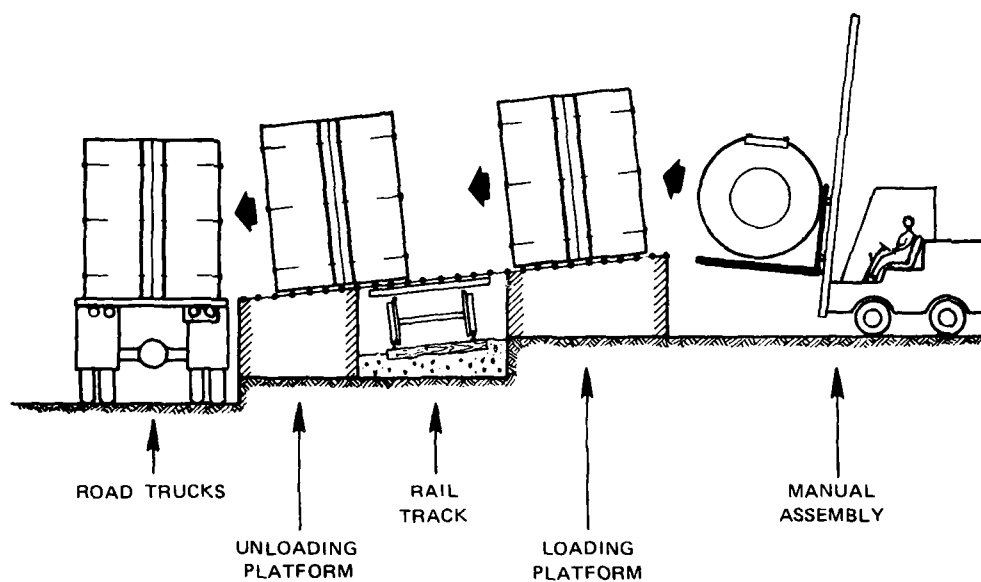
June 1982

○ Indicates nodes
△ Indicates milestones



PROVISIONAL PROGRAM DEVELOPMENT DIAGRAM

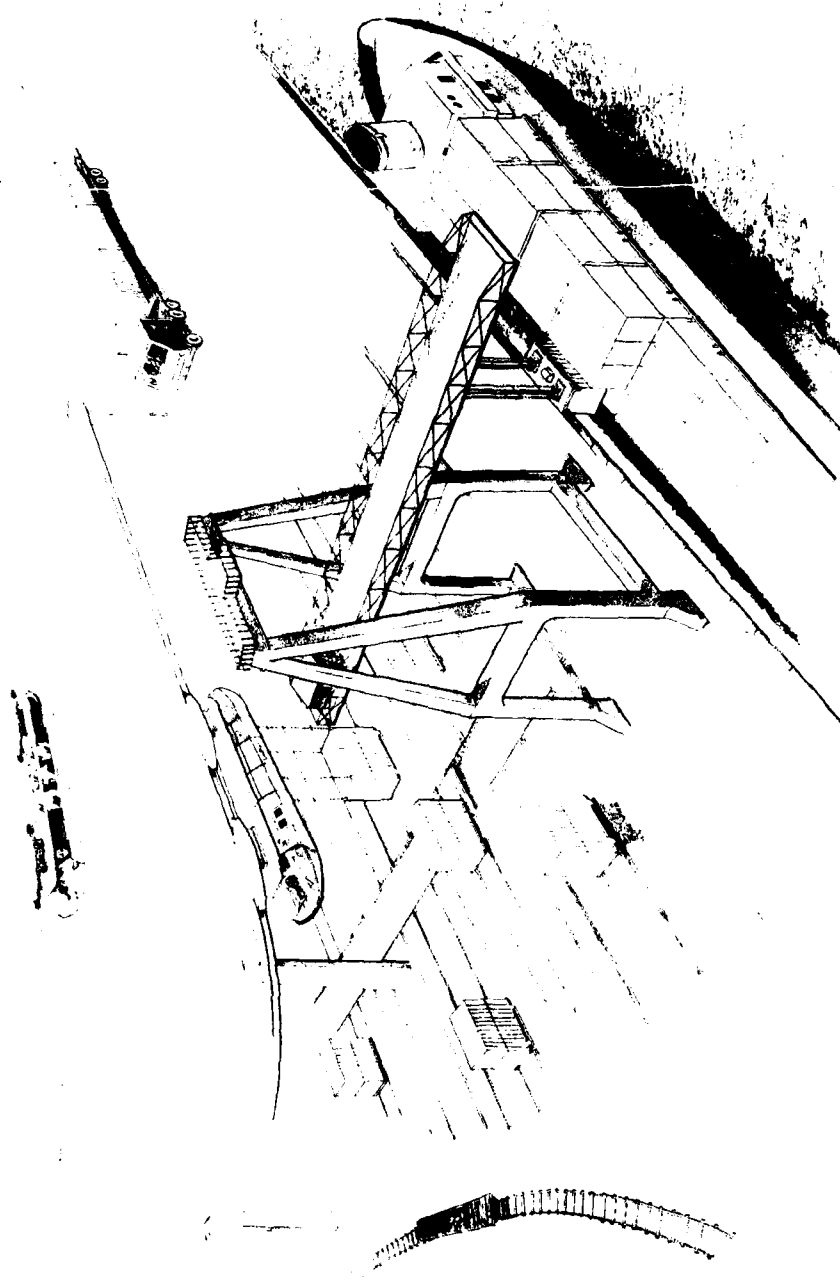
FIGURE 35



CONTAINER TRANSFER SYSTEM

CONCEPT FOR UNIT TRAIN UNLOADING/LOADING

FIGURE 36

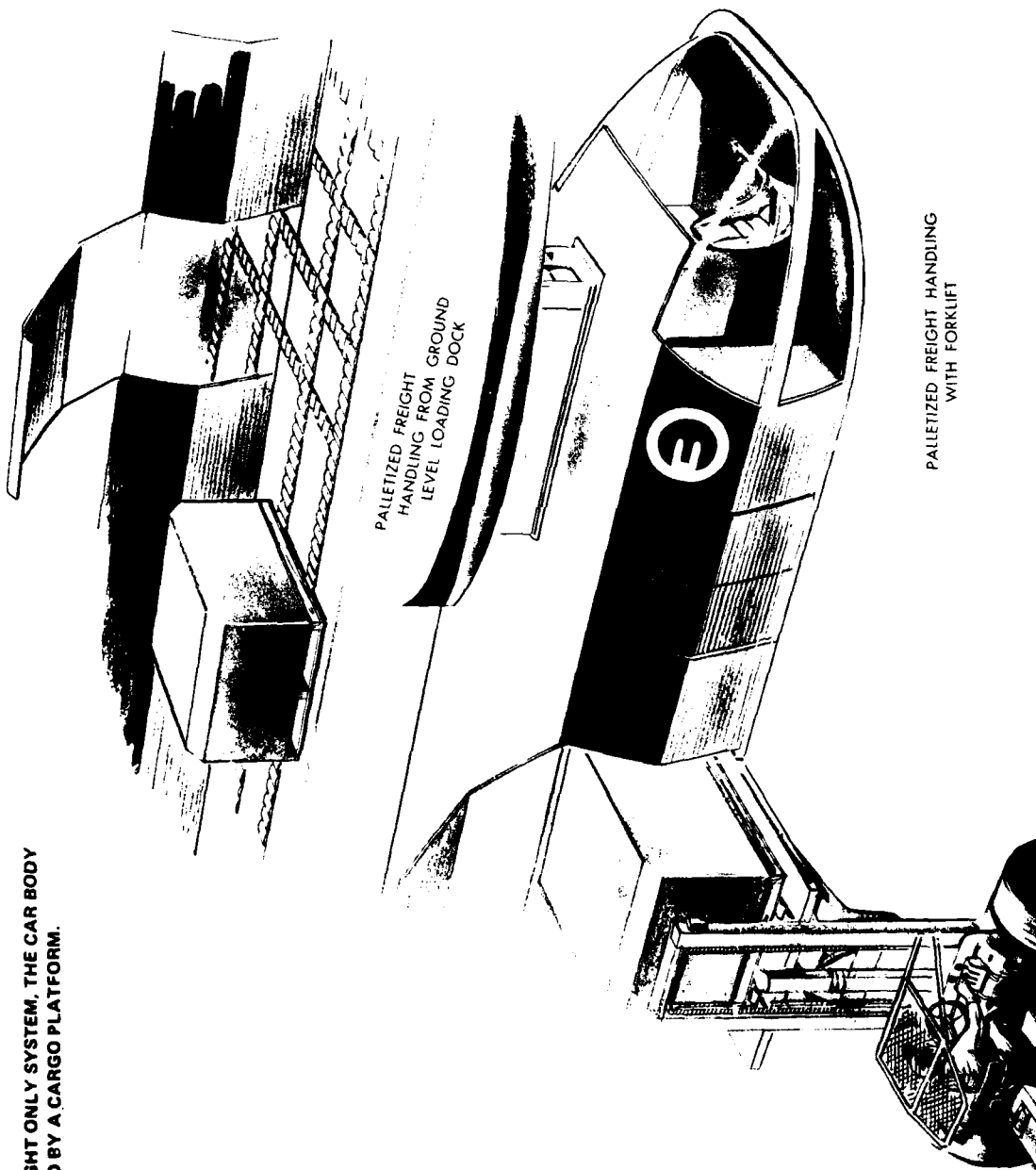


FOR A FREIGHT ONLY SYSTEM, THE CAR BODY
IS REPLACED BY A CARGO PLATFORM.

PROPOSED CONTAINER TRANSFER FACILITY (SYSTEM)

FIGURE 37a

FOR A FREIGHT ONLY SYSTEM, THE CAR BODY
IS REPLACED BY A CARGO PLATFORM.



PROPOSED CONTAINER TRANSFER FACILITY (LOADING ARRANGEMENT)

FIGURE 37b

CHAPTER VII

PUBLIC INVOLVEMENT PROGRAM

The transportation system serving the San Pedro ports is comprehensive and extremely complex, consisting of many modes on ground, on water and in the air. With rapid port expansion, the overall transportation system, which has received little comprehensive attention in the past, is no longer adequate. The result is that a comprehensive modernization is essential between now and the year 2000. So drastic is the modernization recommended in the transportation plan that complete new systems must be inaugurated which, in turn, are certain to create a perceptive upheaval in the status quo, as well as cause considerable disruption in the physical plant. It is probable that public resentment will be generated unless all concerned community groups and agencies are well acquainted with the need for change and the objectives of the plan.

The recommended public involvement program is thus designed to reach a broad array of community groups and public agencies. The program includes physical aids, information dissemination techniques, and feedback procedures. These elements are described in enough detail to facilitate broad public participation. A suggested schedule format is provided to achieve maximum public response. Finally, there is a list of ingredients for success for conducting the program.

An extremely important part of the planning process is the identification of issues and their association with citizen goals and aspirations. Citizenry as well as commerce in the San Pedro ports area will have an influence in determining planning for future facilities. The public must be encouraged and given opportunities to participate early in the planning process. Furthermore, a public record must be maintained to document this process. For public participation to be meaningful it must be presented in such a fashion that outputs are useful to community decision makers.

Many members of the public would propose their own individual solutions, not realizing that a massive transportation plan must take into account the overall objectives and complexity of the undertaking. Therefore, it is important that the public involvement program become an educational process to inform the public of what is being planned while allowing them to express opinions and to contribute to the process. Actual participation in the process can be shown to help achieve personal goals and to satisfy private concerns. It can also utilize ideas or suggestions which may be forthcoming, and which may have been overlooked by the professionals. As a vehicle for interaction between community decision makers, plan proponents, and the general public, the public involvement program will provide a basis for anticipating potentially controversial issues by identifying community issues related to the plan.

Issues of the plan as a whole must be identified and then extended to include such items as jobs, residence, shopping, traveling, recreation, and the effect of the plan on lifestyles to which the public has been accustomed in normal day-to-day life. And because of the wide diversity of port activities, there are many differing interest groups associated with the San Pedro ports area. This leads to a complex and interwoven public reaction which, if not identified at an early date, will be difficult to unite with the program later as it develops. In addition to individuals, consideration must be given to input from municipal, state and private agencies, associations, organizations, and concerned citizens' interest groups.

It is important to realize that unless the public is fully informed and their advice received at the "front end," considerable opposition may be generated to the extent that implementation of the plan could become completely stalled. The public involvement program must have an open-door policy whereby anyone who feels concerned has a vehicle by which he or she may discuss ideas with the professionals and know that their concerns are being taken into account.

The transportation plan will take some 20 years to implement. During this time, many alterations will probably take place but, more importantly, the people involved in the public participation process will certainly change. The program should therefore be designed to accommodate this change.

Information must be made to bring all individuals participating in the program up to date. To accomplish this, it is suggested that a log of decisive events, in summary form, be initiated at the beginning of the program and gradually formed into a brief synopsis of plan development. Such detail should then be specially documented periodically (say, at 6-month intervals) and made available on request of would-be participants, especially those who have not previously been involved. When a number of workshop sessions, public hearings, and other types of public forums are held, each new session should be preceded by a synopsis of what has taken place previously. This can be done in writing or (preferably) verbally with appropriate graphic aids. (Various graphic aids are discussed later in this chapter.) In order to ensure continuity in the program and to initiate new members, the updating of these items is especially important. Those not previously reached will thus be able, to some extent, to bring themselves up to date before they actually participate in the program. Incidentally, good, regularly updated graphic displays will do much to attract public participation.

A. Spheres of Influence

There are many spheres of influence of the proposed transportation plan which the public involvement program must address. These are illustrated in Figure 38. As seen from this illustration, the Corps

of Engineers is shown at the coordinating center of events, but it is probable that the local sponsor will chair the meetings.

The grouping of interest parties and participants will differ according to their function or interest. Generally they may be addressed under the following categories:

- The Ports (including the Naval Facilities)
- Carriers/Shippers
- Politicians/Elected Officials
- Public Agencies
- Citizen Groups and Individuals.

Different communications techniques are needed for each group according to their particular interest, and the manner in which they may become involved. Various ingredients include technical/non-technical material; financial and funding information; beneficial results; and various methods of participation and response. The use of existing public relation programs is recommended.

B. Communications Network

As indicated above, a wide variety of agencies and people is likely to be concerned with this public involvement program for the overall transportation plan. Therefore, it would be extremely unwieldy, perhaps almost impossible, for the lead agency (i.e., the Corps of Engineers) itself to deal directly and effectively with all. Accordingly, it is necessary to establish a recognized and workable communications network, illustrated in Figure 39.

Many of the agencies concerned in the public involvement program already maintain their own mailing lists, public relations departments and publicity programs. These should be used to the maximum extent possible.

The communications network is therefore designed to make use of existing organizations in involving the public. This will avoid entirely new programs being established. To augment this process, the lead agency should address:

- technical versus non-technical releases
- formulation of feasible mailing lists
- news releases for the media
- brochures
- work groups (technical).

The communications network is intended to describe the organization to be established to deal with a fully comprehensive public involvement program. However, it will not be effective unless individuals in organizations are given the responsibility specifically to act on the material and information being distributed, and monitor the events as they take place.

C. Implementation of the Program

1. Information Delivery Aids and Procedures

In order to reach the variety of groups affected by the transportation plan, the following information delivery aids and systems are suggested. These elements should be designed specifically to disseminate the information, educate the public on its implementation process and requirements, and receive constructive feedback in the form of suggestions and comments.

Symbol. Identification of the transportation plan is of primary importance. A symbol is therefore recommended to facilitate this identification. The symbol should be used on all plans, brochures, graphics, models and other items distributed as publicity or information regarding the plan. This would include official materials as well as public relations aids.

Newsletters. These should be printed and distributed on a scheduled (perhaps monthly) basis to all public and private organizations.

Press Releases. These should be issued to the various newspapers, trade journals, advertising media, and technical press which have a circulation in the extended area relative to the port complex, i.e., the harbor and industrial and residential areas.

Brochures. When produced, the brochures may be made available at port and other locations in the harbor area, plus Chambers of Commerce of the cities concerned with the developments. They can also be made available as handouts to visiting dignitaries and groups, at meetings and at public information booths.

Kiosks. These units are used to show graphics of schedules, plans, and developments. They include artists' renderings of the total end products and such items as question and answer sheets, the name of the individuals responsible for particular elements of the public involvement program, and other material which must be distributed on a general basis. Kiosks should be portable so that they may be moved from time to time to keep the public fully informed without individuals having to travel considerable distances to see them. Initial locations for these kiosks would be, for example, shopping centers, fairs, Los Angeles City Hall, Long Beach City Hall, the Port of Los Angeles Administrative Building, the Port of Long Beach Headquarters Building, and the community center in the Long Beach Naval Facilities.

Physical Models. These are an extremely good medium for showing the end results that can be expected. It will, however, be appropriate for physical models to be made only when design is

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RECONNAISSANCE REPORT ON SAN PEDRO PORTS CALIFORNIA(U)
UTN CONSOLIDATED INC IRVINE CA JAN 79 DAC 89-78-C-0025

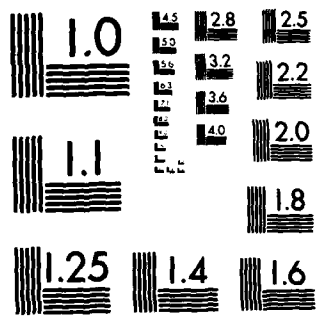
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

under way and when the configuration for the elements is known. Models present an opportunity to educate the public on what is to take place at San Pedro and are of great interest in themselves. They should, of course, be built so that they can be moved from place to place.

Booths. It would be appropriate for booths to be set up to supplement major events such as fairs and conventions. Booths require attendance by a knowledgeable individual who can answer questions from the public, and/or give brief (2-5 minute) presentations with the available materials.

Exposystem. The exposystem is an easily assembled system of upright panels for two-dimensional displays. As a foldable, portable device, this would be especially useful for short-term display of graphics.

Slide Shows. A slide show is a useful public-relations tool. If well planned, it can be both entertaining and educational. Through slides and narration, a foundation can be developed upon which all interested parties can gain a common understanding of the project, its scope, its elements, and the end results than can be expected.

Overhead Projector. This is a useful aid for portraying detailed material such as engineering drawings.

Caramate 3340. This unit has the capability of presenting slides to a small audience on its own 9-1/2" x 9-1/2" front screen, or to a larger audience by projecting onto a separate screen in the conventional way. The equipment is portable, simple to adapt, and easy to operate for closeup or distant projection.

Movie Shows. Movie shows cost considerably more than slide shows and are less adaptable. Nevertheless, they can be extremely effective in transmitting a message, particularly where that message is one of motion. Professional preparation is advisable.

Lunchtime Circuit. The public involvement program should take advantage of this practice to capture the interest of philanthropic and community organizations and, through individual members, the public.

Radio/TV Publicity. Radio and television publicity is an obvious means of initiating interest. This coverage should include short presentations on talk shows, invitations to visit demonstration sites, notices of public hearings and workshops, and general information to create interest in the plan and to inform people how they may participate.

2. Public Response Methods

Workshops. Workshops are useful tools to facilitate communication among responsible public agencies and citizen groups on specific elements or problem areas of the transportation planning process. They can be most effectively utilized as problem-solving meetings and forums for analyzing plan elements. Their implementation can be scheduled to take advantage of the participation of port planning participants and interested groups and agencies throughout the planning process. To be effective, they must be thoroughly prepared and properly staffed.

Community Survey. This is a useful aid to assess the opinions of a community without the formality of public meetings and other gatherings. A survey may also tap a section of the community which is unwilling, unable, or too timid to attend and participate in public. Although its effect is limited to generalities, it is a useful tool to assess overall public reaction.

The contents and format of the survey sheets will depend on the detail required, the type of people to be addressed, the results expected, and the means of evaluation. Two such survey forms which have actually been used are presented in the appendix. The first, entitled, "Public Concerns: Response Sheet," is a simple format. The second, entitled, "Community Survey," is more detailed, representing an in-depth search for a considerable amount of information. This second survey is accompanied by analyses of results.

Public Hearings. Public hearings form a legal requirement and ensure that the citizenry has an opportunity to challenge the actions of a public agency. Because of the formal, legal nature of a hearing, they are generally held toward the end of the planning process to provide a review opportunity to the public.

A public notice convening the hearing, together with other notification to the individuals likely to be interested, must be published ahead of time to enable attendance to be meaningful. All testimony received, including written material, is recorded and an official transcript prepared.

D. Program Organization

Public participation programs will be enhanced when a schedule of events is formulated and maintained, and each method utilized is not isolated from the overall planning process. Presentations, group meetings, newsletters, information packets and workshops should precede or follow appropriate phases of the planning process. The public participation program should reflect the overall schedule of planning and implementation. The design of the public participation program

should follow the procedures covered in Engineering Regulations, adapted to suit the particular subject matter and the audience involved.

Public participation programs should be as comprehensive as their subject matter. A model which could form the basis of the program is shown in Figure 40. The model utilizes a monthly newsletter, agency contacts, presentations, group meetings, workshops and scheduling of urban public notices which should take place in conjunction with the scheduled activities. Such phasing is necessary to conduct an accessible public involvement program which above all requires agency and public participation. The model is shown in draft form. A finalized version would become more detailed once the objectives and purpose of each element are more fully defined.

E. Ingredients of Success

Set forth below is a list of suggested ingredients for the success of the public involvement program. It may be borne in mind that individuals possess varying social backgrounds, interests, temperaments, and character.

One further factor must also be borne in mind when operating the public involvement program: the success of Proposition 13 in California. This factor is bound to affect the public's considerations of the transportation plan. Those involved in the program (including the planning, design and operating professionals) must expect to have to justify their proposals. It may be assumed that the public now recognizes that it pays for improvements either directly through taxes or indirectly by other means.

The following is a summary of suggested ingredients for success of the public-involvement program:

- Make the program an educational process. Divide it into stages depending on how much information can be absorbed at one time; avoid overkill.
- Ensure that graphics, charts, audio-visual, and other materials are well prepared.
- Check to see that display materials and oral presentations are continuous and coordinated; avoid isolation of subject matter.
- Speeches and presentations should be critically "dry run" beforehand, and have a positive attitude.
- Prepare thoroughly for all events beforehand; people, places and materials should receive prior attention.

- Keep the identification of issues in proper perspective with the overall plan; keep plan updated.
- Provide concerned individuals and organizations with information as to progress. Respond to contributions; maintain continuity. Have knowledgeable professionals (where appropriate) discuss input and suggestions with the organizations or individuals concerned. Inform them whether their contributions can or will be used.
- Maintain attendance records for continuity, regularity and feed-back. Issue agendas for each meeting.
- Advertise events widely to ensure attendance and interest.
- Avoid political implications or undertones.
- Keep the public involvement program up to date with planning progress.
- Make meeting locations convenient, comfortable, welcoming, and hospitable.

* * * * *

APPENDIX TO CHAPTER VII
COMMUNITY SURVEY EXAMPLE FORMS

Note: This exemplifies the text to be used
and not the specific format.

PUBLIC CONCERNS: RESPONSE SHEET

Check the Appropriate Box

☐ Resident of Centre City

☐ Business Person

☐ Concerned Citizen

Please rate the following list of social problems as to how important you feel they are within the San Diego Centre City redevelopment areas.

	Very Concerned	Moderately Concerned	Slightly Concerned	No Concern at All
Quality of Public Services _____				
Services for Senior Citizens _____				
Rising Housing Costs _____				
Rising Taxes _____				
Rising Prices _____				
Crime / Delinquency _____				
Drug Use, Alcohol Abuse _____				
Traffic Noise _____				
Traffic Congestion _____				
Smog _____				
Unemployment _____				
Undesirable Types of Business _____				
Redevelopment Activities _____				
Relocation and its Costs _____				
Upgrading the Downtown Area _____				
Historic Buildings and Places _____				
Maintaining Existing Business and Social Ties _____				
Relocating in the New Downtown Area _____				
Aircraft Noise _____				
Railroad Noise _____				
Additional Residential Areas Downtown _____				
Parks and Recreation Facilities _____				

Would you relocate within the downtown area after its redevelopment? _____

Please read the following statements and rate them as to the extent you agree or disagree with what they say.

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
1. Redevelopment is one of the ways to bring new business and residential development downtown. _____					
2. Relocation is beneficial for the present residents and businesses in the redevelopment area during implementation of the actual redevelopment process. _____					
3. Redevelopment might not provide relocated residents and businesses an opportunity to return to new housing and commercial areas within the Centre City. _____					
4. Redevelopment will improve the level of public services in the redevelopment area. _____					
5. Presently, the Centre City is a good place for existing businesses and residents, and does not need redevelopment. _____					

On the following lines, please describe what improvements you would like to see in the redevelopment areas in downtown San Diego.



December 9, 1976

Dear San Fernando Valley Resident:

Your household has been randomly chosen from a sample of homes in your neighborhood to participate in a large-scale community survey of East Valley residents. Enclosed is a copy of the survey which is being conducted by VTN Consolidated, Inc. of Irvine, California, on behalf of the City of Burbank. The purpose of this questionnaire is to measure the prevailing attitudes of East Valley residents towards their communities and environment.

Your response to this survey will help ensure an accurate assessment of your community's needs. The information obtained from this survey will play a significant role in the public decision-making process which could affect your community's daily life. Therefore, please answer the following questions, as accurately and honestly as you can, and return the completed questionnaire in the self-addressed, stamped envelope provided. All responses to this questionnaire will be treated confidentially. All questionnaires will be analyzed in such a manner that we will have no way of knowing which individual matches each questionnaire.

Due to the urgency of receiving your response in time for consideration, and the upcoming busy days of the holiday season, we have established a cut-off date for receiving returned questionnaires. For your questionnaire to be considered, it must be postmarked no later than midnight, December 17, 1976.

Your response to this questionnaire is important. Your cooperation is greatly appreciated, and we thank you for the time you have taken to complete the questionnaire, ensuring an accurate, representative sample from your community.

Sincerely,

Michael R. McClintock,
Principal Planner
Community Development and
Planning Department
City of Burbank,
California

MRM/lb

Enclosure

All responses to this questionnaire will be treated confidentially. Please try to answer all questions as accurately and honestly as you can. All data are coded by number, we will have no way of knowing which individual matches each questionnaire.

1. How long have you lived at your present address? (Circle one)

- a. Less than one year
- b. 1-3 years
- c. 4-6 years
- d. 7-9 years
- e. 10-12 years
- f. 13-15 years
- g. 15 years or more

2. Do you: (Circle one)

- a. Own your house
- b. Rent your house
- c. Own your condominium
- d. Rent your condominium
- e. Rent your apartment

3. Please circle the 3 main reasons why you came to, or have stayed in the area.

- a. Housing costs were right
- b. Close to where I work
- c. Could find work here
- d. Easy to get on freeways
- e. Close to transportation
- f. Close to shopping
- g. Close to churches and temples
- h. Close to friends/relatives
- i. Quiet neighborhood
- j. Good schools
- k. Good health services
- l. Could not find another place
- m. Nice looking area
- n. Child care available
- o. Good neighbors
- p. Other (please specify) _____

4. Do you plan to move in the next 2 or 3 years? (Circle one)

- a. Yes
- b. No

If so, why do you plan to move? (Please specify)

5. Where do you plan to move to? (Circle one)

- a. Within the neighborhood
- b. Within the community of _____
- c. Within the San Fernando Valley
- d. Within Los Angeles County
- e. Out of Southern California

6. On a scale of one to seven, how would you rate your neighborhood as a place to live? (Circle one)

Very Poor							Very Good
1	2	3	4	5	6	7	

7. What three things do you most like about your neighborhood? (Please specify)

1. _____
2. _____
3. _____

8. What three things do you least like about your neighborhood? (Please specify)

1. _____
2. _____
3. _____

9. What do you consider to be the most serious problems presently facing the community? (Circle three)

- a. Rising taxes
- b. Rising prices
- c. Crime/delinquency
- d. Drug use
- e. Noise
- f. Services for senior citizens
- g. Traffic congestion
- h. Smog
- i. Quality of public services
- j. Unemployment
- k. Other (please specify) _____

10. Are you disturbed by neighborhood environmental problems? (Circle one)

- a. Yes b. No

If yes, please circle the environmental problem which disturbs you the most at your present place of residence. (Circle one)

- a. Smog
- b. Odors
- c. Aircraft noise
- d. Street traffic noise
- e. Freeway traffic noise
- f. Railroad noise
- g. Neighborhood noise
- h. Other (please specify) _____

11. If you are disturbed by aircraft flying out of Hollywood-Burbank Airport, during which period of the day are you disturbed the most? (Circle one)

- a. Morning: 7am to 12pm
- b. Afternoon: 12pm to 5pm
- c. Evening: 5pm to 10pm
- d. Night: 10pm to 7am
- e. All the same.
- f. I am not disturbed by aircraft noise.

12. When do you usually find aircraft noise more disturbing? (Circle one)

- a. Weekdays
- b. Weekends
- c. Every day
- d. I am not disturbed by aircraft noise.

13. If you are disturbed by aircraft noise, do the disturbances occur on a: (Circle one)

- a. Regular or predictable basis
- b. Irregular or unpredictable basis
- c. Don't occur at all.

	Very Much	Somewhat	Not at all
Sleep (night time)	_____	_____	_____
Sleeping children (daytime)	_____	_____	_____
Sleeping adults (daytime)	_____	_____	_____
Telephone conversations	_____	_____	_____
Personal conversations	_____	_____	_____
Studying/reading	_____	_____	_____
Watching television	_____	_____	_____
Outdoor activities	_____	_____	_____
Other (specify) _____	_____	_____	_____

15. Please fill in the number of the comment which best describes your feelings about the truth or accuracy of the following statements.

Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
1	2	3	4	5

Number

- _____ Aircraft noise and vibration damage my home.
- _____ Aircraft noise and vibration endanger my family's health.
- _____ Hollywood-Burbank Airport brings jobs and revenue to my community.
- _____ Aircraft flying over residential communities are a safety hazard.
- _____ Hollywood-Burbank Airport is a convenient source of transportation for me.
- _____ Overall, I feel that Hollywood-Burbank Airport is making improvements in the noise situation.
- _____ Aircraft noise is a violation of my right to privacy within my home.
- _____ Overall Hollywood-Burbank Airport is good for the community.
- _____ Increased aircraft noise would cause me to consider moving from this neighborhood.
- _____ As a member of the community, there is much I can do to control aircraft noise.
- _____ Aircraft noise makes my family nervous and irritable.
- _____ Hollywood-Burbank Airport is to blame for the most serious problems facing my community.
- _____ Purchase of Hollywood-Burbank Airport by a public agency or government will help to improve the noise situation.

16. To homeowners only.

How do you think Hollywood-Burbank Airport affects the value of your home? (Circle one)

- a. Reduces it a lot
- b. Reduces it a little
- c. Doesn't affect it
- d. Increases it a little
- e. Increases it a lot

17. To Renters only.

How do you think Hollywood-Burbank Airport affects the amount of rent you pay? (Circle one)

- a. Reduces it a lot
- b. Reduces it a little
- c. Doesn't affect it
- d. Increases it a little
- e. Increases it a lot

18. If it was totally up to you to make changes to Hollywood-Burbank Airport, which of the following would you do? (Circle one)

- a. Make no changes
- b. Expand it to its full potential
- c. Increase airline service
- d. Set a limit for the amount of noise allowed
- e. Reduce the present number of flights
- f. Stop all night flights
- g. Shut it down completely

19. Do you or members of your family ever use Hollywood-Burbank Airport? (Circle one)

- a. Yes
- b. No

If so, how would closure of Hollywood-Burbank Airport affect you? (Please specify)

20. Please list the number of persons within each of the following age groups who are currently living in your home.

- ____ Under 5 years old
- ____ 5 to 19 years old
- ____ 20 to 24 years old
- ____ 25 to 34 years old
- ____ 35 to 44 years old
- ____ 45 to 54 years old
- ____ 55 to 65 years old
- ____ Over 65 years old

21. Please circle the category which best describes the highest grade level you have completed in school.

- a. Non-high school graduate (grade 11 or less)
- b. High school graduate (high school degree)
- c. Some college (1 to 3 years of college)
- d. College graduate (4 year degree)
- e. College post-graduate
- f. Vocational or trade school graduate

22. Please circle the category which best describes your family's total income in 1975 before taxes.

- a. Less than \$5,000
- b. \$5,000 - \$9,999
- c. \$10,000 - \$14,999
- d. \$15,000 - \$19,999
- e. \$20,000 - \$24,999
- f. \$25,000 - \$29,999
- g. Greater than \$30,000

23. Are you currently (Circle one)

- a. Employed, full-time
- b. Employed, part-time
- c. Self-employed
- d. Unemployed
- e. Retired

24. Are you: (Circle one)

- a. Male head of household
- b. Female head of household
- c. Husband and wife answering together
- d. Housewife

25. If you have any additional comments you would like to make, please write them on a separate sheet of paper and attach it to this questionnaire.

CHART II-6
NEIGHBORHOOD RATING

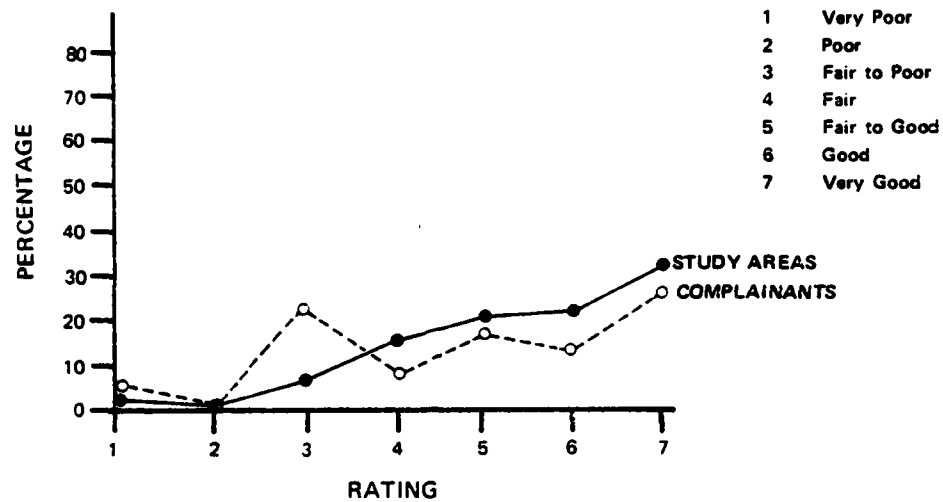


CHART II-7
THINGS LEAST LIKED ABOUT
THE NEIGHBORHOOD

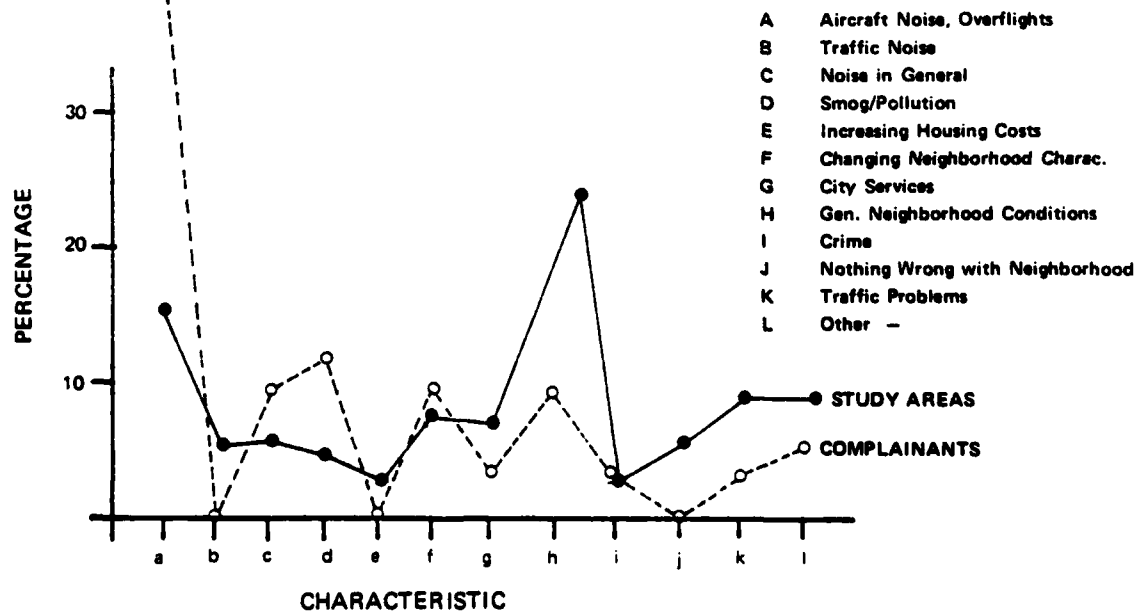


CHART II-8
MOST SERIOUS COMMUNITY PROBLEM

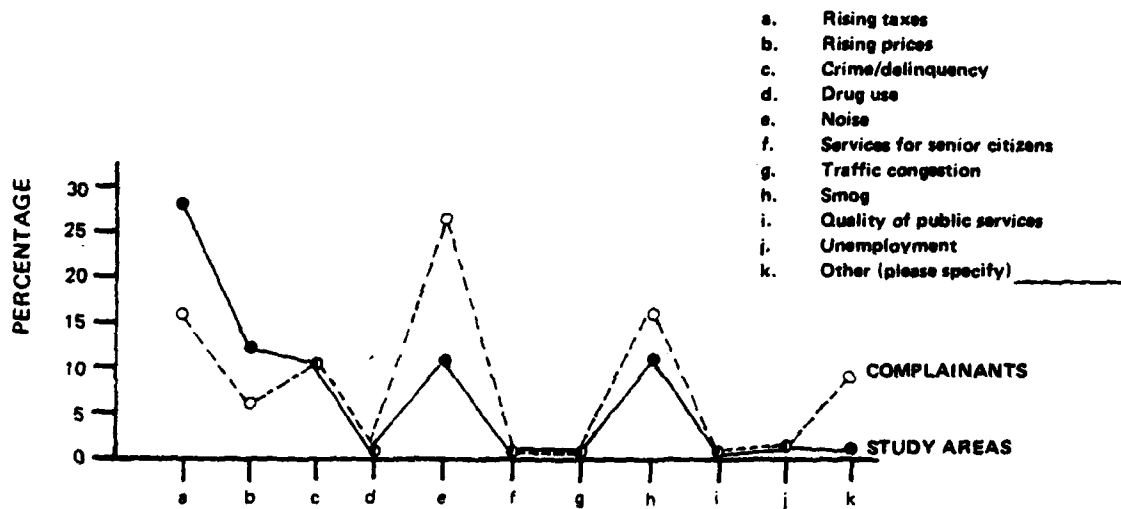


CHART II-9
ENVIRONMENTAL PROBLEM

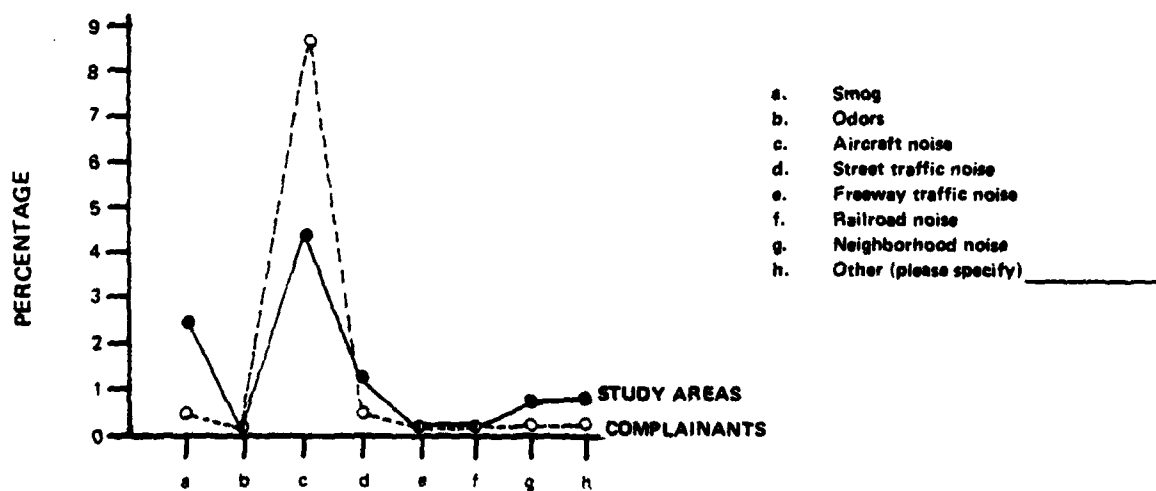


CHART II-10

AIRPORT IMPACT ON HOUSE AND RENTAL VALUE

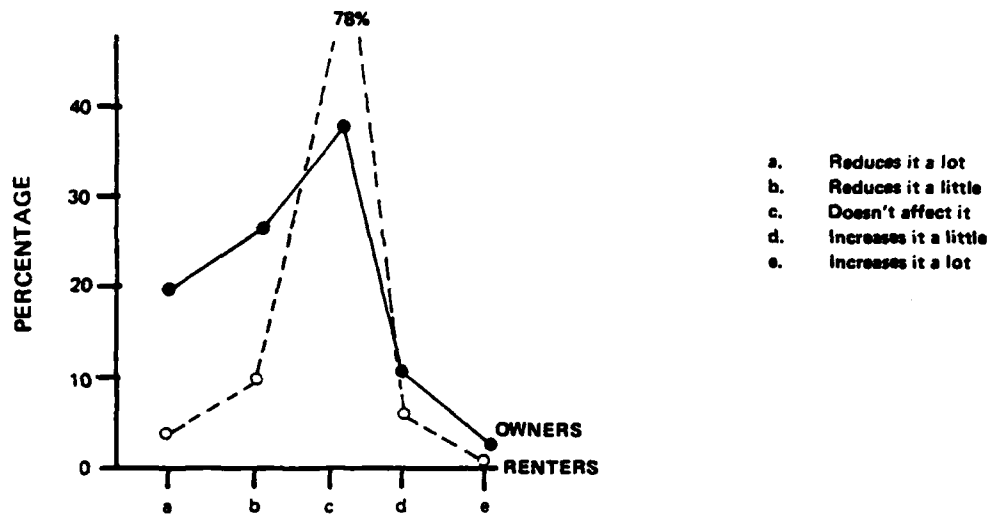
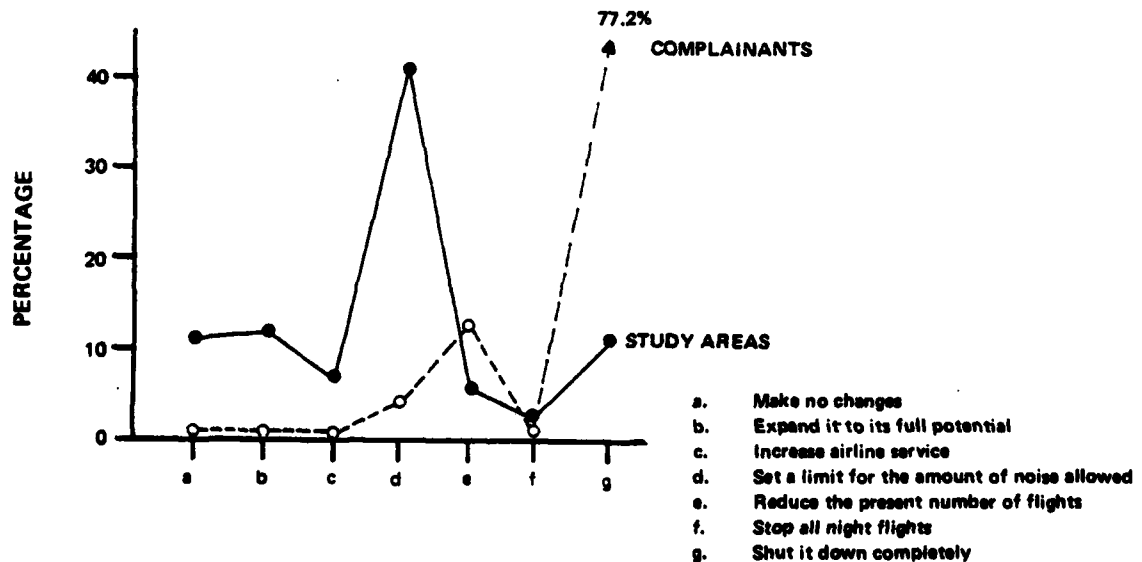
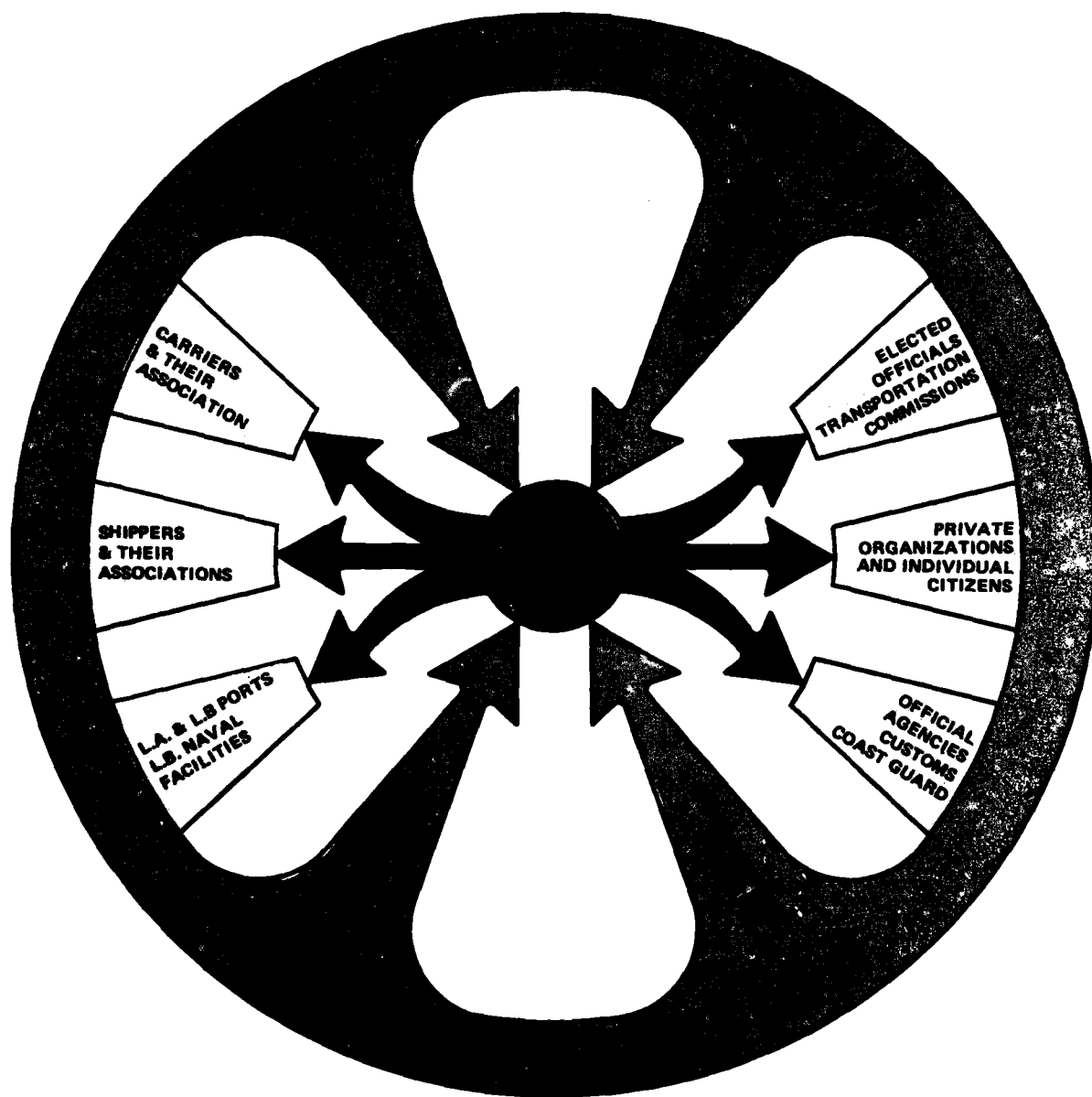


CHART II-11

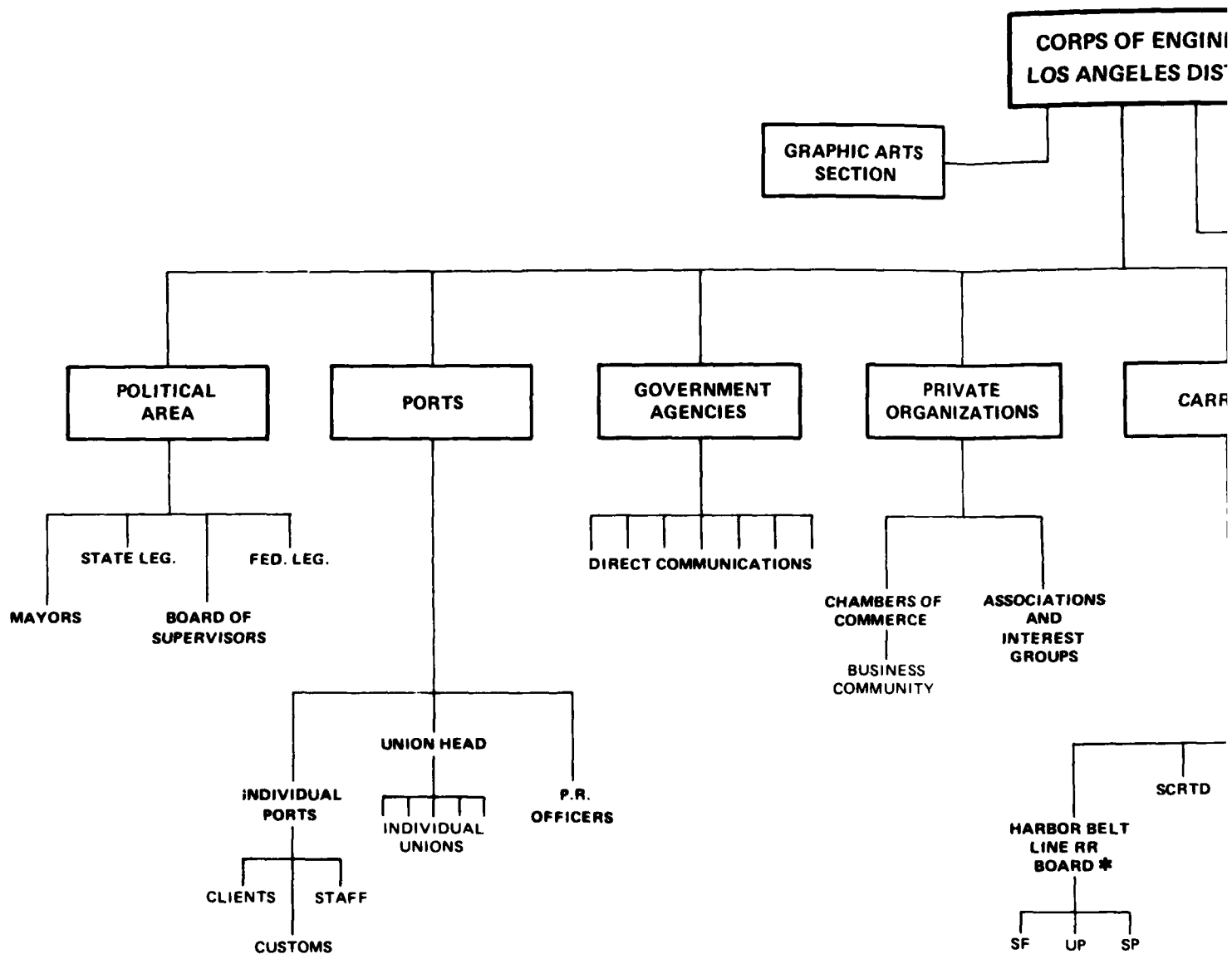
AIRPORT FUTURE



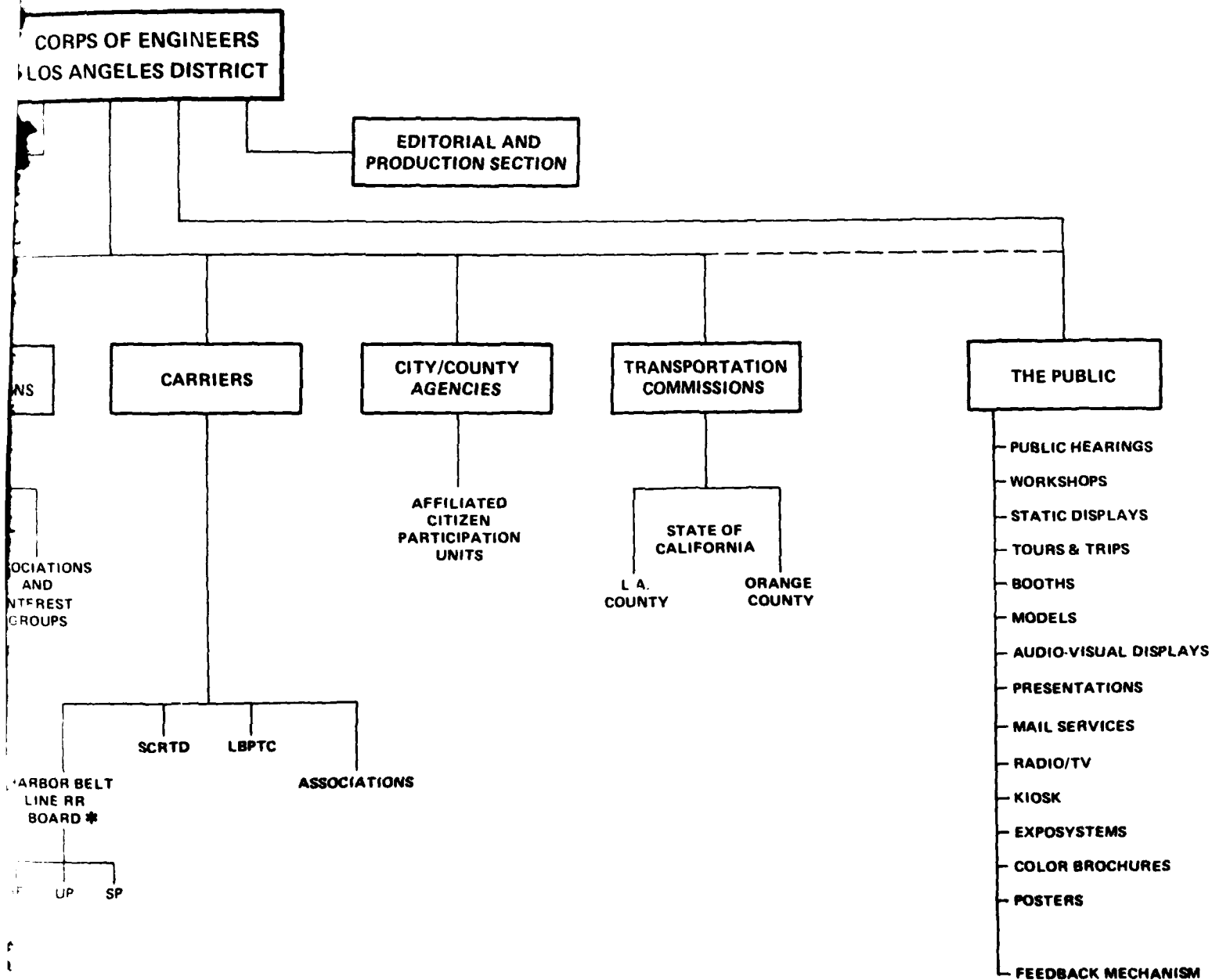


SPHERES OF INFLUENCE

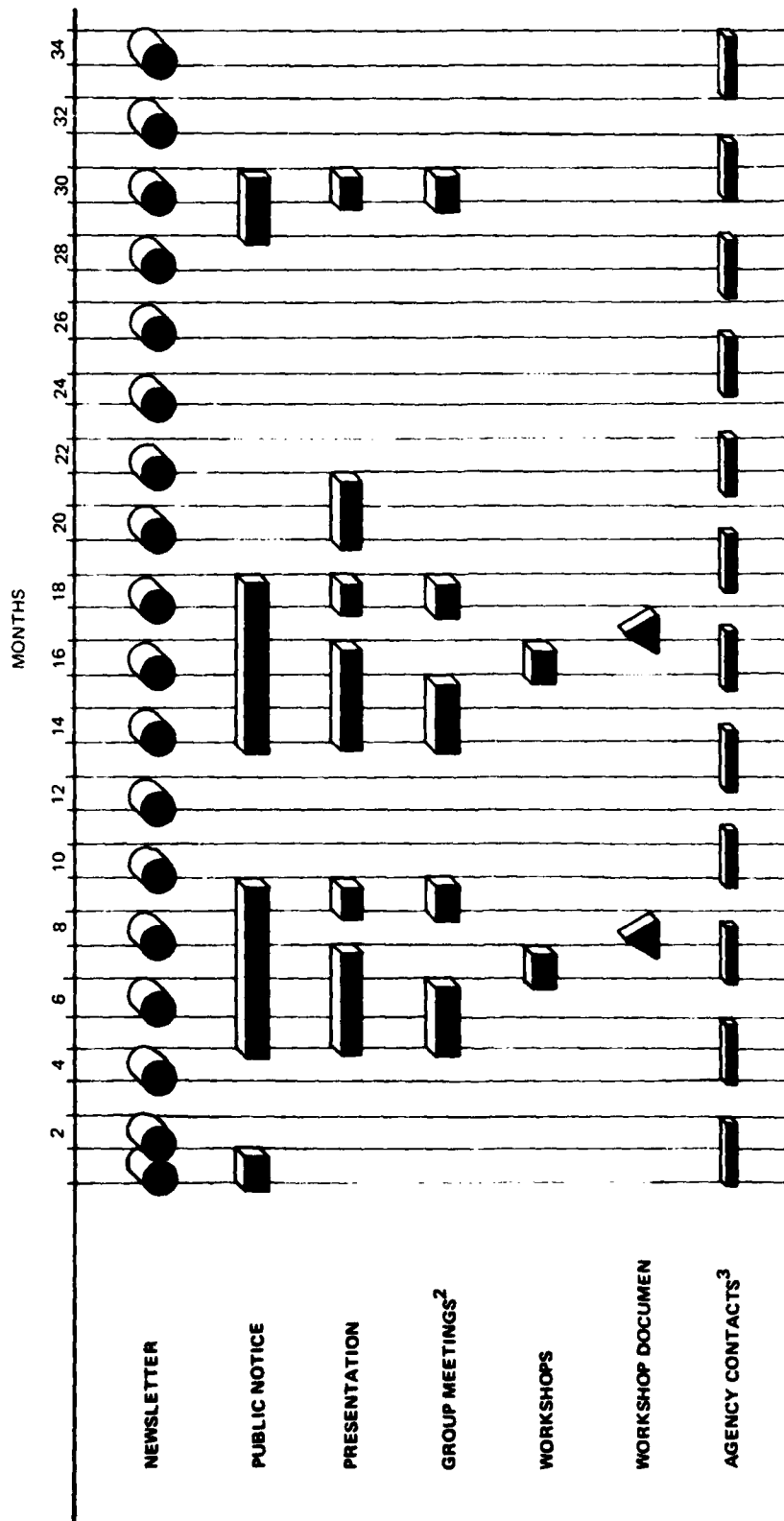
FIGURE 38



* Direct communication to each RR as an alternative.



PUBLIC INVOLVEMENT PROGRAM -COMMUNICATIONS NETWORK



NOTES:

1. The newsletter should continued throughout the implementation and construction phases of the plan.
2. Group meetings could include the "luncheon circuit."
3. Contact with concerning agencies will be on a daily working basis.

MODEL PUBLIC PARTICIPATION PROGRAM

FIGURE 40

CHAPTER VIII
CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The estimated total cost of this feasibility study is \$1,020,000 based on the amount spent for this report and the work effort to complete the study. The cost allocations are displayed on Figure 41, Study Cost Estimate (PB-6).

The milestone schedule based on the critical-path type network shown on Figure 35, and based on the receipt of full capability, is shown below.

<u>No.</u>	<u>Title</u>	<u>Proposed Date</u>
2	Approval of reconnaissance report	March 1979
3	Submittal of Stage 2 documentation to Division	January 1981
4	Stage 2 checkpoint conference	February 1981
5	Completion of action on MFR	March 1981
5A	Intermediate public meeting	June 1981
6	Submit draft survey report and draft environmental impact statement	September 1981
7	Stage 3 checkpoint conference	October 1981
8	Complete action MFR	November 1981
9	Coordination of draft survey report and draft environmental impact statement	February 1982
9a	Late stage public meeting	April 1982
10	Submittal of final survey report and revised draft environmental impact statement to Division	June 1982
11	Release of Division Engineer's public notice and submittal of report to BERH	July 1982

Recommendations

It is recommended that this reconnaissance report be approved as a guide for completing the proposed feasibility report.

* * * * *

STUDY COST ESTIMATE (PB-6) (0000) Per use of this form, see EN 11-3-220		APPROPRIATION TITLE General Investigations		NAME OF STUDY San Pedro Ports, Ca			
CATEGORY Surveys		CLASS Navigation		SUBCLASS			
SUBACCOUNT		CURRENT FEDERAL COST ESTIMATE			PREVIOUS FEDERAL COST ESTIMATE AND DATE APPROVED (1 Oct 77)	REMARKS	
NUMBER	TITLE	STAGE 1	STAGE 2	STAGE 3			TOTAL
a	b	c	d	e	f	g	h
1 .00	Costs through 30 Sep 78	150	0	0	150	0	
2 .04	Cultural Resources Studies		2	0	2		
3 .05	Environmental Studies Except Fish and Wildlife		175	75	250		
4 .06	Fish and Wildlife Studies		9	3	12		
5 .07	Economic Studies		125	50	175		
6 .08	Survey and Mapping		4	2	6		
7 .10	Foundation and Materials Investigations		10	5	15		
8 .11	Design and Cost Estimates		50	25	75		
9 .12	Real Estate Studies		10	5	15		
10 .13	Study Management		125	75	200		
11 .26	Recreation Studies		5	0	5		
12 .31	Supervision and Administration		75	40	115		
13	TOTAL	150	590	280	1,020	1,450	
14							

DATE PREPARED 1 Oct 78	DIVISION South Pacific DISTRICT Los Angeles	REGION California - South Pacific BASIN South Coastal	Page 1 of 1
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DATE
LMED
-8